

AVIATION WEEK

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50 CENTS

To our friends
the world over

Season's Greetings



THE





the Douglas RB66A

Ends to perform in the atmosphere, or to scrape through in low-level missions, the new U.S. Air Force RB66A will be one of the most versatile photo reconnaissance planes ever designed.

Complete performance data must still answer most, but the Air Force predicts

release of the information that the Douglas RB66A will be in the 600 to 700 mph class—with range enough to fly deep into enemy territory, and return. Powered by twin jets, slung in pods below the wing outboard of the fuselage, RB66A will carry the most

modern photographic equipment, for accurate reports on operations.

Design of RB66A is another example of Douglas leadership in aviation. Plans also can be produced in quantity to fly faster and lower with a larger payload in a basic concept at Douglas.



Depend on DOUGLAS

First in Aviation

Domestic

A Trans World Airlines Super Constellation was damaged when it made an emergency night landing at the Palm, Nevada, Naval Air Station, 70 mi from Las Vegas Dec. 7. No. 3 and 4 engines hit fuel. Flame roared off the runway, and lapped the right main landing gear and damaged the wing tip. None of the 30 passengers or five crew members on the New York San Francisco flight was injured. Cause of the engine failure was not given.

Robert T. Ames, Jr., president of Aero Design & Engineering Co., Bethany, Conn., has been elected chairman and to the board of governors of the United Airplane Council of the Aircraft Industries Assn. for 1955. He succeeds C. F. B. Ruff, president of Aerofield Motion, Inc., Syracuse, N. Y., in both positions.

McDonnell Aircraft Corp. last week named Kendall Perkins, vice president, engineering, to the head of division and to the chairman of the board. C. W. van Dine, vice president, manufacturing, and already a board member, was elected to the executive committee. President James S. McDonnell, Jr., and Robert H. Chubb, vice president, aircraft, are the other members of the executive committee. New vice presidents are: Gerald C. Conington, airplane chief engineer; William A. Ruff, factory manager; Wilbur S. Osborn, Jr., manager of personnel and public relations; and John F. Aldridge, Jr., manager of sales and service. Executive committee shifts were reallocations with announcement of the resignation of Don Rubin as vice president/general manager, to become president of Pacific Helicopter Corp. He replaces C. Hart Miller who assumes as Pacific executive vice president/general manager.

Detcon Harvester Co. has purchased all assets of Clinton Machine Co.'s Warner division, one of the largest manufacturers of aircraft and airborne hydraulics, for cash. The excess of a million dollars.

Merita Viking 9 rocket attained 135,000 altitude during Navy firing at White Sands Proving Grounds, N. M. The 7½ ton rocket achieved a speed of 5,500 mph.

Aerovion Airlines has received a large contract to deliver Air Sea-Cat, Bu. Bu. 601, for aircraft carrier for 50 percentage DC-6s. Conversion will allow Aerovion to double its scheduled transcontinental tourist service by early spring of 1955.

Republic Airlines Corp. has paid the \$100 million price in metal wings, and so be the first into a Long Island, N. Y., firm has reached this mark.

NEWS DIGEST



DE HAVILLAND DOVE de Havilland Aircraft Co. Ltd., which landed Dec. 9 near Staten Island Airport, N. Y., killing pilot and co-pilot and injuring two F4C officials. The

Aviation Distribution and Manufacturers Assn. new officers elected this month at Miami include: L. W. Tins, Secretary; Myron G. Brown, Executive Director; C. W. van Dine, President; Lawrence F. Ziegler, General Counsel; S. J. Ruff, President; and James Ruff, National Administrative Corp., Amherst, Pa., vice president.

General Dynamics Corp. has paid a last quarter dividend of 7½ cents a share. Not only for the firm and its subsidiary, Convair Ltd., amounted to over \$10 million during 1952. Backlog of the corporation has been estimated at \$35 million.

International

Society of British Aircraft Constructors announced a temporary level of about 2,500 workers in the British aircraft industry followed by an increase of 10,000 workers during 1955. Until recently announced production cutbacks of obsolescent types, the British aircraft industry has been growing at a rate of about 2,500 workers a month during the past year.

Japan will start negotiations soon on civil air pacts with Sweden, Denmark, Norway, The Netherlands and France, according to Nippon Times. An air agreement has been reached with the U. S. and a pact with the U.K. will be signed soon.

One for all

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A veritable stream of paperwork starts flowing the very second Glenn L. Martin Company receives a contract to design and build a plane. Preparing all these papers may well be compared to the actual building of the plane... standardization, quality, economy, simplicity and interchangeability are all of paramount importance. That's why you will find Remington Electric-economy typewriters at work throughout the Martin plant in Baltimore.

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Remington Electric-economy Typewriters at work at the Glenn L. Martin Co.



Remington Rand THE FIRST NAME IN TYPEWRITERS

WHO'S WHERE

In the Front Office

J. V. Nash has been elected executive vice president of Consolidated Vultee Aircraft Corp., San Diego. He previously was vice president for sales and contracts at General Aircraft Corp. He has been with J. G. Zivich.

Donald G. Krenn has been appointed as assistant to the president of Stark Aircraft, Inc., where he will coordinate production and flight design contracts in addition to administrative duties.

Col. H. L. Anderson, vice president of Philippine Air Lines, has been elected a member of the board of directors. In addition to his vice president duties he has named C. M. Woods general traffic and sales manager and Josephine Rogers director. Col. Walter H. Hunt, Jr. general operations manager, Robert T. Ryan, treasurer, Donald M. Gault, secretary. Other new appointments were James D. Thomas as controller and Capt. Elmer Abel Smith as general industrial relations manager. Col. Lee A. Tolson has been named administrative assistant to Col. Anderson.

Changes

Blair E. Lefter has been named director of manufacturing for Aviation Engineering Corp., L. I., N. Y.

Robert S. Kimes has been named manager of industrial engineering and planning for the Wright Aircraft Co., Wood Ridge, N. J., a newly created position. Kenneth Mulheisen, general manager for Wright Aircraft, is leaving to accept a position in the aircraft field in New York.

Robert Seely has been assigned to investigate and coordinate production for the contract factory for Silvermaster Manufacturing Co., Los Angeles. W. T. van der Naal has been appointed senior project engineer at Avia Aircraft.

Barbara Tyler has been named executive assistant to the administrative head of Northrup, Inc., Seattle, Wash. She previously was with Raytheon Corp.

Allen W. Skidmore has been executive staff assistant to vice president engineering at Avia Corp., N. Y.

Frank Gillette has been appointed head of Phil Corp., a new industrial division.

Albert E. Nimsy has been named chief engineer of the Test Equipment Group Department at the Tucson plant of Republic Aircraft Division, Republic Aircraft Corp. and Republic Capital is now chief engineer of the V-Metric, Communications and Navigation Engineering Dept. of Republic Aircraft.

Edward N. Townsend has been designated representative of supply and contracts at Lockheed Aircraft Corp. in Birmingham, N. Y., and Mark J. Model has been named production representative.

Kenneth J. Levens has been appointed assistant division manager and general works manager of General Aircraft Aircraft Co., Tucson, Ariz.

INDUSTRY OBSERVER

USAF is getting ready to award a development contract for a lightweight "stepped-down" intercepter (Aviation Week Oct. 15, p. 11) with North American Aviation, Inc., most likely to get the job. Lockheed and Northrop also are in the competition.

Cessna's supermodel bomber, for which USAF is studying a production contract (Aviation Week Oct. 8, p. 11), is known as the "Thunder" within the company and had been given the designation XB-16 by Air Force during the design study phase. It is likely that new USAF designation will be assigned in the production version to be built at Cessna's Ft. Worth plant.

Aviation's accident has delayed flight testing of the concurrent wing Handley Page H.P. 50 bomber, according to industry observers recently returned from England. Five during hydraulic fluid dosing operations killed one mechanic, injured several others, severely damaged the bomber's nose and caused the collapse. Previously, the H.P. 50 landing gear collapsed just before arrival flight tests and kept it out of the Philadelphia SBAC show. The five is expected to delay flight testing for at least three months. The H.P. 50 bomber also is expected to serve as a prototype for the H.P. 97 jet transport (Aviation Week Sept. 28, p. 15).

Working of the latest military agreement as the Army's merged aviation and missile branches for manufacturers now developing concepts—plans for use by the General Forces. Industry observers are wondering why the nation (Aviation Week Sept. 28, p. 10) refers to "today's wing jet aircraft, the total lift and propulsion of which are achieved solely from nozzles." This theoretically would eliminate hybrid aircraft using jet engines for forward thrust and designs which would utilize their wings for lift.

Aviation division of General Motors Corp. notes that jet engines built in its Indianapolis plant have been kept out of 2 million lb. of thrust have 10 jet aircraft twice as much jet operations as General Motors, Ltd., largest British jet engine manufacturer.

United Aircraft has given RCA a short-term order under study and development contract aimed at eventual use of subsonic jet engine, distance and other weapons. Under the program, RCA, which now handles the AN/AP-45 jet transport engine for the military service, is studying the feasibility of producing a jet engine, reducing complexity and cost and adapting equipment for engine flight operations.

The problem is the fast approaching end of heavy peace operations for aircraft manufacturers is how to reduce the manufacturing required for South East Asian use of large droppings. Airframe manufacturers would like to get these large parts off the post as "grossing" equipment. Little further machining would be required before arrival in Southeast Asia, making cost of these parts runs from \$20 to \$100 for each pound of weight carried. Another problem is the distance involved in large droppings during machining operations.

Paul E. Whitney Aircraft's general manager, Bill Geline, recently noted a new spot that has troubled U. S. manufacturers trying to build jet engines of British design. British thrust engines are based on the average output of engines coming off the production line with as much as 10% difference below the guaranteed rating still acceptable for delivery. U. S. engines are a minimum guarantee and every engine accepted must deliver rated power. According to British standards, a jet rated at 5,000 lb. static thrust would deliver only 4,800 lb. and still be accepted. According to U. S. standards, even engines that do not deliver guaranteed output of 5,000 lb. thrust would be rejected. Thus, on a standard production line operations involving engines of the same rated thrust, U. S. manufacturers are building engines which are more powerful than their British counterparts.

OSD: Still Mushrooming

Office of Secretary of Defense, was it was created under the 1947 Authorization Act to cut down military cost, has mushroomed from a \$1-million-a-year operation to a \$14-million-a-year operation, and it still grows. OSD doesn't think \$14 million is enough, asked \$15 million for the current year, but Congress trimmed the request.

Although funds for suicide and other weapons were held down during the pre-Korean years of defense conservatism, OSD has grown steadily year by year. OSD employment rose 54% in the fiscal year 1948, and will be up to around 1,000—about a line field general.

Overall OSD includes the staff directly under the Secretary of Defense, plus the staffs of the Joint Chiefs of Staff, Munitions Plans and Research and Development Board.

• Budget home has been in Munitions Board, owner of production and procurement, which in five years has developed more than seven-fold, from a \$312,000 a-year operation to a \$6-million operation.

• Secretary of Defense's direct staff has grown from a \$934,600 a-year operation to \$4.6 million, more than a four-fold increase.

• Cost of Joint Chiefs of Staff operations has gone from \$577,000 to \$1.6 million a year.

• Most modest increase is in Research and Development Board, which has developed from \$1-million-a-year to a \$1.5-million-a-year operation.

Research and Development

Although plans procurement orders will start to taper off in 1956, the upward trend in Air Force and Naval Air contracting for research and development projects is expected to continue indefinitely. That is in line with the decision to put emphasis on technological advance meat instead of weapons stockpiling.

Both USAF and Naval Air are well along in obligating the year's research and development funds—about 75% which is an industry contract.

• USAF obligated about \$193.5 million of its research and development funds in the July to November period, an average of \$48.5 million a month.

• Naval Air obligated \$65.5 million in the period, an average of \$16.5 million a month.

• Unlike USAF and Naval Air, only about 40% of its rate of obligating for the first four months of fiscal 1955, then still runs out of funds to contract before the end of the first July 1.

• For the remaining months of fiscal 1955, USAF has \$777 million and Navy more than \$130 million to obligate for research and development.

But USAF's and Naval Air's pockets are bulging with unspent cash accumulated for research and development projects already underway. The total still about \$1.4 billion.

Korean Record

For the period from the start of the Korean war June 25, 1950, to December 1955, the services give this report on aerial performance:

• Air Force: 548,460 positive sorties.

• Naval Air, including Marine aviation: 281,035 combat sorties.

• The division of effort: USAF 63%, Naval Air, 37%. This requires some adjustment in favor of the Navy, since the Naval service also includes observation or helicopter flights and USAF sorties include all sorties beyond the front line.

Patterson Backtrack

An Transport Act gracefully dropped down W. A. Patterson's suggestion that Interstate Commerce Commission be given authority over air transport legislation. The United Air Lines president's proposal.

"We should welcome the recommendation," said the Interstate Commerce Commission conference the activities of the various regulatory agencies act as moderator, coordinator, and court of appeal."

But ATA, a few days later, unanimously voted a re-affirmation of its longstanding position in favor of an independent Civil Aeronautics Board. Apparently in a gesture to Patterson, however, the association backed on a clause stating its willingness to consider or reconsider any proposal for a different organization. Patterson went along.

Local service lines particularly are salient in favor of an independent board. James R. Washington, representative of private line carriers, said: "Young airlines probably would be unaffected under ICC regulation. If an transport had been under ICC in 1947, there wouldn't be any local carriers."

Naturally, potential opposition (let CAB is "disturbed by the intended action," "overbureaucratic and unhelpful behind the independent agency organization, for an economic regulator and do not want it lumped in with other agencies."

People

Senator Weeks, successful businessman dated to be come the new Secretary of Commerce, is expected to clamp down on federal support for airports, airports to change and other public works. During his last service at the Senate, Weeks' major concern was the economy, and strong defense, including air power, would appear to be a major concern and attacked government action on public works that he observed at the time. "You can have more aviation or less aviation but cannot simultaneously have a variety of the two."

Walter Wilson, designated to become the new Undersecretary of Commerce in a package of Mutual Air Lines' director Paul Hoffman. He followed Hoffman as head of the Committee for Economic Development and later joined Hoffman in working Republican line the Republican administration. He was defeated for the Washington Senate seat by Sen. Warren Magnuson in 1950, but made a remarkable showing for a political newcomer.

Sen. Alexander Wiley, top-making Republican in Senate Judiciary Committee, wants to start off the year with an investigation to ascertain whether political in finance has spread in the Democratic Administration's appointment of officials to high related positions in firms sized during World War II. General Aviation Film and Doc Corp., headed by Jack Frey, former TWA president is the top firm in Wiley's list. Among the directors of the firm appointed by the Democratic Administration. Sporn Corp. director Thomas Minge and TWA counsel Gerald Bregley.

—Katherine Johnson

AF Aircraft Deliveries Hit Postwar High

• Gilpatrick says manufacturers met 98% of schedules in November; farther stretchout appears doubtful.

• But production delays, engineering difficulties with J65 engines, F49 and F84F planes are reported.

By Robert Hoke

Aircraft manufacturers are meeting their production schedules for the Air Force and as farther stretchout is contemplated, according to USAF Undersecretary Russell L. Gilpatrick.

Delivered or scheduled to USAF in November totaled the highest post-war World War II. Gilpatrick said. A total of 665 planes, representing nearly 3 million man-hours, were accepted from manufacturers last month. The figure represented 95% of schedule by weight and 98% in terms of man-hours.

Gilpatrick emphatically denied that there had been any major shift in USAF production goals since the original stretchout of last January, although he admitted three new production schedules had been submitted to the Munitions Board since the A-1's stretchout schedule. However, the A-1's schedule (AVIATION WEEK Aug. 25, p. 14) called for delivery some 16 million man-hours postwar at production rates from the next two years until late 1955 and early 1956. Normally USAF accounts for about 75% of total aircraft production.

Under a recent Munitions Board decision, Gilpatrick disclosed, the aircraft schedule a year will have to be filed by USAF and Navy under the production program is changed by at least 10%.

• Questions Arise—Indicates, however, aircraft schedule Gilpatrick said, of the current USAF production stretchout. They noted that except for the specific problems mentioned by Gilpatrick and the recent action by both USAF and Navy to phase out production of obsolete equipment from earlier than scheduled (AVIATION WEEK Nov. 24, p. 14), there were no indications of major changes in the plan. Gilpatrick said that only a "comparative inattention on equipment of funds already appropriated could change materially the present outlook for the stretchout period until 1956.

USAF production has nearly doubled their deliveries of aircraft during the past year, Gilpatrick said. Deliveries for December are expected to total 733 planes, with 730 expected in January.

Plane Deliveries

The following table shows the number of planes actually delivered to the Air Force for the months specified and the schedule for future deliveries to end 1956.

Deliveries	
November 1952	730
November 1951	365
May 1952	586
November 1952	666
December 1952	733
January 1953	730
April 1953	730
July 1953	730
July 1955	586
June 1956	365

The peak production rate of 836 planes a month will be reached early in the second quarter of 1953, about four months later than planned under the stretchout program.

Although Gilpatrick claimed there is

no major lag in the Air Force production program as a whole, he admitted that production delays and engineering difficulties are being encountered on certain new aircraft and engine models. He noted:

• Wright Suppressor (B3) jet engine problems.

• Northrop Scorpion (F89) night fighter structural difficulties (AVIATION WEEK Dec. 7, p. 16).

• Republic F-84F Thunderstruck program.

Gilpatrick said it will be necessary to replace aluminum compressor blades with steel blades in the first three stages of the turbine and flow compressor because of vibration problems at nine-tenth revolution per minute. He said aluminum blades in the Scorpion are cracking under vibration encountered in the 4,000-6,000 rpm range and that USAF pilots are restricted to get through the portion of the engine's operational range as fast as possible. Normal range is for the 3,500 to 4,000 rpm. The critical range is encountered just after idling and just before landing.

• Need New Blades—Several months' production of the B3 will continue with aluminum blades to meet the demand for this engine by several F-84F production units. Republic's Scorpion, an F-89, plant. These steel B3 blades will be used with steel and other components. Under the stretchout program, the new type blades Gilpatrick and Wright had designed and tested steel blades in the standard and was planning to use them in production. He also said that similar vibration problems had been encountered in England as Scorpions built by the Armstrong Siddeley Co.

Wright has built enough B3's to take care of the first F-84F, now coming off the Republic line, but Gilpatrick and the Navy engine plant was operating a "tight production line" and will wait in the process of testing for its principal production. Wright has gained an official 150-hr qualification test with aluminum blades and Gilpatrick emphasized that "there is strong support for the Scorpion across the board in the Air Force."

Concerning on persistent reports that the Scorpion production program was the prime bottleneck in the military aircraft production program, Rep. William C. Cramer (Wright Corp. president) said:

"The American people who are foot-

ing the bill are content to leave the truth about its power. Although it is being made suddenly to discredit the successful record of French production in the country. The act itself could be to scuttle the aircraft production program and to interfere seriously with the defense of the United States."

► **Rollins Statement**—At Rollins, where C-W has a plant currently manufacturing aluminum compressor blades for the J85, Harley said:

The J85 engine is capable of developing substantially greater power ratings than the engine will require after blades entered the current aluminum alloy blades. The Rollins plant is building steel blades which have passed their Air Force model tests.

However, aluminum blades which the Rollins plant is also producing are currently substituting for engines of the present power ratings. This type use of steel blades will be a natural refinement to meet increasing power requirements. The change of the engine in such that the aluminum blades can be replaced by steel blades at any intended period."

A Corbin Wright spokesman said the J85 completed a 150-hour testbed run using steel compressor blades in November. The J85 now is running 5,000 hr. of testbed and flight test time, according to the spokesman.

Rollins has not yet passed a 150-hr test on its Suprajet and will produce steel testbed blades to complete its production testing. Corbin Wright likely would require substitution for the critical tests to get under way.

► **Auto Main Lease**—We find that automobile manufacturers are pretty sure that their methods are sufficient to tackle aircraft engine production. "I'd guess so. And we have some quality control problems and this indicates that aircraft engine builders' standards are somewhat higher than the rest of Ford, Nash, Chevrolet and the rest of the auto business in the aircraft program."

The combined output of Wayne and their well private engine suppliers to meet the growth of F-35F production schedules and also to take care of the newest Martin B-57 Cavalier when it gets into production next year, Galpin said.

USAF experts might to continue engine development and eventually come up with an 8,500 lb thrust engine under the same rear-cow design by Armstrong-Whitely after an official British 148 hp qualification test. The current Wright engine is rated at 7,300 lb static thrust.

► **F-35B Two-Fold**—Collette said Air Force had concluded that the Northrop Scorpion designations at the Detroit Air Show had August-1970 Wright Sept 15 a 171 hp engine pilot or exceeding the critical aspect for which

the aircraft was not listed below 10,000 ft. USAF officials previously reported that the F-35B had been restricted to speeds under 450 knots below 10,000 ft.

The Republic F-64F program had shipped several months behind schedule, according to Collette, but the situation is now improving. "The Thunderbolt is now being. He noted that there would be a temporary dip in Republic's production output as the plant shifted from F-64G Thunderbolt to the new "scorpion" F-64F.

"The real happen over time as we reach production is a never and better place," Galpin said. "It will continue to happen as long as the Air Force is in the present leadership, because it is not policy to stress for constant improvement of the quality of our aircraft even at the expense of the maximum possible production."

"Republic is now the largest single producer of jet powered combat aircraft on this side of the Iron Curtain. I have no reason to doubt Republic's ability to accelerate production of the F-64F in view of its previous history in building up output of the F-64G in a rate of 10 a day."

Air Force has obligated about half of its fiscal 1971 procurement funds, and each in December reached a strength of 95 combat and troop carrier wings.

"While our aircraft program will continue to experience some delays in pro-



COLLIER WINNER

John Snick, MCAE award winner, and a group of his named associates at the MCAE Langley Memorial Laboratory test awarded the 1971 Collier Trophy for their work in developing a wind-tunnel capable of conducting research through the two main speed range. Research results obtained from the tunnel have been a major contribution to production of U.S. combat aircraft capable of operating at the speed of sound. The Collier Trophy committee reported

duration and technical difficulties as long as no coherent to show qualitative improvement and to bring in new types, we anticipate no major setbacks in our program and no major changes to plan the industry," Galpin concluded.

French Develop New Jet Braking System

(McGraw-Hill World News)

Four-SNECMA is a flight testing a "jet decelerator" that tests the thrust of a jet engine something like 130 deg toward the front giving a braking effect that permits landing on a much shorter strip.

Flight tests began July 26 on a Vampire equipped with a de Havilland Goshawk engine. SNECMA (Société Nationale d'Etude et de Construction de Moteurs d'Aviation) says the tests have been "very successful."

Design and performance data are exact, but SNECMA says officially "The goal sought of reducing the length of landing strips is achieved. It is even possible to land and stop the airplane without using wheel brakes."

Although official information is to say the jet decelerator works in ground only, excellent success was a ground description. They say a smaller (light or two) of small jet engines could the aircraft during the engine. A medium size position thrust to these engines, which gradually turn them forward and reverse braking action.

► **Vampire Test**—In the Vampire, two issues on each side of the nacelle improve the maintenance of wheels at the tail, so they are installed only on the nacelle top and bottom.

The decelerator has been tested for use on the Vampire, but requires no more than two tests. After a series of factory experiments, the decelerator was installed on the Goshawk in the summer of 1971 and put through a factory testbed model.

The Harrier's Vampire was chosen for the initial testing because it is an conventional French air force plane, a slightly modified type called the Harrier, powered by a Hispano-Suiza Neve in stead of the Goshawk.

The jet decelerator has been used four times since then. After a series of factory experiments, the decelerator was installed on the Goshawk in the summer of 1971 and put through a factory testbed model.

► **British Interest**—From Nov. 22, 1971, to Jan. 1, 1972, a British company will be testing the decelerator on the Goshawk in the summer of 1971 and put through a factory testbed model.

Installation of the decelerator on the Vampire began Feb. 21 and that phase few July 7 for the first time without use of the decelerator.

SNECMA says the results of all these

tests are "very satisfactory—even spectacular." A mission from the British aviation industry also has watched decelerator tests and is reported to be interested.

Breather Pilot Seat Eases Long Flights

The Air Force now adopt a standard equipment a pilot's seat designed to relieve the stress on fighter pilots kept in the air for long periods during non-combat missions as in a night refueling. Service tests produced favorable results, according to reports.

After a few hours in flight, a fighter pilot gets tired from sitting and doesn't do anything much he can do about it. He must stay seated in his seat for the length of the long, shifting his weight about to ease pressure. Even the Navy's standard seat isn't comfortable on long flights, it is reported.

The pilot's seat is a "breather" which to relieve pressure and pressure circulation. The pilot's seat can get its pressure from the air supply to the cockpit canopy and a small cycling motor directs the air to the various compartments of the seat from time to time. The pilot's seat is reported to be so gentle the pilot normally isn't conscious the equipment is functioning. Its effectiveness is marked even for the duration of a 10 hr. flight according to claims. Weight of the seat/seat is about 1 lb.

It has been tried in comparison with the Navy's standard seat and reported highly effective in the combination.

Lear VHF Set Gets CAA Certification

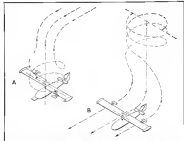
Lear, Inc., has obtained CAA type certification of its 36-channel VHF transmitter-receiver, permitting its use on aircraft operating on scheduled international and foreign airports.

First announced earlier this year, the LTVR 36 includes a 5 watt 36-channel VHF transmitter, a 36-channel receiver, and a remote frequency selector. The set is designed to allow the transmitter to be installed and operated by itself, and the receiver added later, if desired. The LTVR 36 weighs about 22 lb and can operate from either 14 or 28 volts dc.

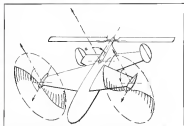
Crash Kills Cosmo Official

Sheldon S. Green, general manager of the Cosmo Aircraft Corporation, was killed in an aircraft accident last week at Richmond, Ind. (Macroeconomic) A plane piloted by Green and a Lake Central Airlines DC-3 collided at a runway intersection.

AVIATION WEEK, December 22, 1972



SWEEPED-WING controls jet engines of this, sets in normal flight (left) and a fixed for horizontal high-speed flight (right).



FIXED-WING design based on Fokker D-XXII, but large tail cone, which can be switched in conjunction with outboard wings for vertical flight.

Army Cool Toward Convertiplane

By Alexander McKeown

Philadelphian-Brightest future for the convertiplane lies in development by private enterprise (underwritten by government money, as well as test, George C. Lawrence, Deputy Army Air Systems Engineer and specific of military-aircraft work, told the Second Convertiplane Air-Conf Congress here.

The nation's government research organizations is incompatible with national achievement in new aviation

fields. Looking back his solution, because of the necessity of accounting for each government research expenditure as a basis of action to the taxpayer. This, he said, negates the current efforts of many brilliant government researchers in aviation, and creates government establishments.

He forecast a trend toward more free enterprise research efforts would be able to risk capital in pursuing projects without incurring a 100% return on each of the projects, so government

mounting systems currently desired.

► **Learning.** Wagon-Lewis wanted greater regulation of aircraft operations and specification by civil aviation agencies.

"CAA, at best, has never regulated as a more recent body than that of the regulators," he said. "The agency that the manufacturers and engineers can usually be forced to agree for changes of regulations based on last year's developments, in the light of newer developments which have happened since the regulations were made. CAA should make an attempt to regulate conceptplanes for 10 years, at least."

Indications that the Army is glibbed with its present and forthcoming helicopters and a less eager desire to get into a conceptplane program were given by the Army spokesman in the evening, Col William B. Beards, chief of Army Air Transport Service Division, U.S. Army.

► **Army Switch.** "The old saying about building a better mousetrap is not enough the time," Col Beards said. "The cost factor enters in. There has to be a worthwhile overall saving, as well as gain in performance."

Beards indicated that if the helicopter could be the Army transport job, conceptplane, it is always preferable, the conceptplane's chances to replace it soon are not bright.

"Perhaps the helicopter may be obsolete in terms of the conceptplane, nevertheless, but all I can see is, it is a candidate in a sense if it is caught in a momentary, whether it is obsolete or not."

The statement indicated a major switch from former Army thinking which called for small Air Force con-

cepts to three manufacturers, Bell, Sikorski and McDonnell for several place prototypes.

► **Theoretical Design.** Earlier Army statements had indicated they considered helicopters in a rotary and conventional, capable of relatively high speed forward flight as well as vertical takeoff and landing are developed.

An interesting array of aerodynamic configurations, designed to combine the advantages of vertical and horizontal flight, were laid before the engineers as a series of engineering papers illustrated with series and model flights at the Princeton Institute, Anderson.

► **Helicopters excluded.**

► **Warner Charney,** Detroit, demonstrated a rubber motor-powered two-rotor conceptplane model which actually made vertical takeoffs and turned its rotors into horizontal thrust for forward flight.

► **Vaughan Louis de Moog** of Princeton of Princeton Aircraft Corp. discussed a number of various configurations for conceptplanes, including an arrangement for making the Princi De Moog conceptplane into a conceptplane with a rotor attached at the tail, which would be elevated on a vertical shaft for vertical flights.

► **Dr. J. A. J. Bennett,** former British aircraft expert, gave a paper on the engineering staff of Hillier Helicopter Corp., discussed a plan for using living cockatoo jet rotor helicopters to boost conventional forward and vertically out of down-tower operations to eliminate the need for long runways. The plan also involves a small landing of the two aircraft for landing place at small airports.

► **Remarks** between the Hillier plan and in Air Force project at All American News to force a helicopter pack-

back on a forward transport, which also would solve the problem of aerial release and aerial attachment, was discussed. Problems of attachment particularly in instrument weather before completed, it was indicated, and further work on the solution to these difficulties is needed.

► **Prof Alfred I. Korson** of City College, New York, discussed a group of conceptplane designs which he has patented. They involve changing the angle of incidence of the wings by as much as 90 deg. to accomplish vertical and horizontal flight while the fuselage maintains its near attitude.

► **Charles Herick,** inventor of the Herick Conceptplane, showed notes of his experiments in the 1930s with controlled flight. Flight of a rotor-carrying aircraft which converted from forward to rotor cruise in flight was included.

► **David C. Prince,** former General Electric engineer, discussed the present rotor rotor system used on the Hughes XH-17 and his subsequent work on concept conceptplane involving rotor rotors.

NCAA Probe Pushed

National Advisory Committee for Aeronautics from a congressional questionnaire only set just as alleged over-employment at its Lewis Flight Propulsion Laboratory in Cleveland.

Rep. George Bender will push for the investigation by House Committee on Appropriations in Executive Department, of which he is a member. NCAA, which has a 111-man education in personnel at the laboratory is the result of an appropriation cut and does not imply that the laboratory has been over-stuffed.

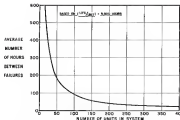


NEW GREUMAN HUNTER-KILLER MAKES DEBUT

Patented just prior to its first flight Dec. 4 at Beltsville, Md., the New Greuman XSGF1 aircraft plane, which now has been built and taken flights in one or more. The XSGF1 has numerous electronic devices for setting its path in all types of

weather. It carries a crew of four. Two Wright R1820 engines of approximately 1,300 hp. drive Hamilton Standard propellers. It is designed for short takeoff and landing distances of less than 1,000 ft. at low speeds while tracking its target. Note

that a miniature tubular jet used in addition to the turbine main landing gear. Two different models of the earlier AF Greuman aircraft plane were required to handle the fuselage, which the XSGF1 now contains.



PRICE OF COMPLEXITY is pointed up in the graph depicting design number of hours between before as a function of total parts of equipment fitted to system.

Jet Prices Too High: Littlewood

Wright Brothers lecturer also tells how engineers could improve safety design of airliners.

William Littlewood, vice president engineering for American Airlines, says U.S. airlines would not be interested in buying jet transports or conceptplanes "which threaten to cost anything like the savings which have been gained in the American price. The firms just do not expect of safety, or of any design to do the job."

The AA executive engineer addressed his views to aviation industry representatives in Washington, D.C., at the 16th annual Wright Brothers Lecture.

Although he didn't name names, he may have been alluding to early reports that Douglas estimated it would take \$30-\$40 million to launch its four-1/2 DC-8, and production units would be given tagged at about \$15 million, each Boeing has said that jet transport development might not run into eight figures and individual models would cost somewhere between \$1-\$4 million.

► **Robert French-Littlewood** also took sharp aim with the slow rate of progress on jets in this country. He indicated that government safety might never government interference in design and that airlines would not be long-sighted transport as which they had so much in design and development. Some manufacturers have decided to finance their projects out of profits, without federal aid.

The Chicago paper, "Technical Trends in Air Transportation" devoted developments of the many refinements in air frame, powerplant and accessory equipment, which at a brief pace of 25 years had to be of the airplane as a mass trans-

portation medium. He also took note of fast many achievements in designing inherent safety characteristics in today's transports.

But he frankly presented numerous instances where improvements could be made in safety design.

Littlewood said there are "present" which are adverse to a quiet and thorough consideration of safety in design, (but) force us to substitute for a consistently critical review of all design from a safety experts' point of view. We have not had of adequate let-it-be."

► **For Safe Design.** Regardless of how future transport configurations emerge, the industry expert hopes they will be based on the low-wing design. "The

unavoidable advantage of low-wing design lies in the area of safety," he said. "It is adopted this argument by changing the low-wing's proven advantages in shortening impact energy and the lifting."

As to manufacturing costs, he said that "turning over existing sets in the new would produce an even, if a much, safety as present. . . . But any action or regulation which limits the direction of sets . . . would be premature and ill-advised."

It is not difficult to see many ways in which aircraft could safety can be made superior to any other" by proper design of their structures, mountings, both and elimination of hard or sharp corners or loose items of equipment that become flying missiles, he said.

Littlewood made some sharp comments on the design methods stating that at least 90% of the ones he knew of, the design was actually spoiled by pressure or carelessness, or because of ignorance because of engine malfunctions, rather than operation of the warning equipment. He said that has been because of improper location of detectors, deficient mounting or materials which have not been worked away, and destruction of controls.

► **Design Must-Checking** equipment to prevent airframe collisions, the AA executive did not consider under the final review. Instead he urged more intensive control flight data and development of cockpit indications and warnings possibly operated on the double principle.

Ready access to aircraft studies, he said, is a safety "design must." In check for safety, he said, the firm should be made up so that they can be explained with reasonable problems. "It has been quite shocking" as had improper stress control conditions, both in materials, loads, and sharp corners in critical structures.

Littlewood also urged that all aircraft manufacturers be in the effective for simplification, noting that there is a continuous development of good ideas emerge concurrently down through every department, but "too one apparently is devoted to taking things off." He saw the equipment manufacturing progress as a highly beneficial one headed in the right direction.

► **Maximum, Minimum.** Continuous progression of a good basic transport design to keep up with increasing cost requirements by stretching the fuselage was discussed by Littlewood, who said a modern contract and specifications for these airplanes should make provision for increasing capacity and power.

Littlewood saw a range expansion for U.S. domestic jet transports as being beneficial especially from 500-750 seats, above and below these distances he believed turbojets will be utilized. At the absolute minimum of aviation range will come the helicopter. Safety factors



WILLIAM LITTLEWOOD

for the latter should acquire twin engine power, especially for operations over congested areas. "The single-engine single-seat transport airplane must out of range many times and we must question the safety factors of such helicopter operations," he stated.

One of the problems in jet transport operations will be landing deceleration, he noted, and he looks confidently to development of reverse thrust devices. **Local Service.** Since jet operations will be carried out at altitudes well over 10,000 ft., there must be absolute assurance of no decompression failures,

Lettersold pointed out. And aircraft fuselages must embody more favorable seat characteristics than present planes, to prevent considerable passenger fatigue following damage in flight.

In his discussion of a local service replacement for the DC-3, the American executive said such a plane probably would have similar engineering characteristics, with probably better landing and takeoff distance performance and improved single engine thrust qualities. Speed and altitude characteristics need not be much different. The approach would be to increase capacity.

Charzchi, always keen to appreciate new weapons, is believed to hold the view that revolutionary or weird weapons are close enough to reality now to risk concentrating available resources on their development.

Mobile East-West and part of the British memorandum of the strategic outlook is strong opinion that Asia and the Middle East are much more important now. This is a big item reversal for the British over the past two years.

Amassment from Downing Street this month involving headlining the ANZUS pact into a Pacific defense organization, including Malaya, India, China, now point the view in the second big and Charzchi has up his sleeve. Before, like France, is known to force a NATO-like structure for cold wars in the far and Middle East. The French obviously want a greater U.S. commitment in their own situation in Indo-China.

Top British officials in the past month again expressed hope the U.S. will be willing to shoulder part of the Middle East—especially with troops.

The Korean War. The British treasury also is alarmed at prospects of footing the bill for the British Korean army after Germany stops paying occupation costs in force.

Any increase in European commitment in Korea is bound to keep an acceptance by the U.S. at part at least, of those requests for burden-sharing. The British still are opposed to developing mass resources in Korea. Top officials say strongly they see no military damage change there. But if President-elect Eisenhower comes up with a plausible program, chances are Britain will go along, provided the load is eased in other parts of the world.

Debate on these matters are certain to be a top subject of an Anglo-American talk next spring and will get people here some requests for aid to support the standing army or conversion of the power. The British realize the short-term risk these strategic assessments in Europe involve, but they contend that the long-term risk of economic waste, plus collapse in Asia, is worse.

Foreign Use Permitted

Provisions will be given foreign air carriers who are without a permit to operate from Canada, Newfoundland, to land to take of passengers and cargo at that airport under certain circumstances, according to new regulations of Canadian Air Transport Board.

The airport manager, after consulting with Canadian immigration and customs, may permit such landings in event goods or passengers being landed are for a licensed sporting career at Guelph, or to further emergencies and delivery of scheduled services.

Britain to Ask NATO Air Slash

By Nat McKinnon
(McGraw-Hill World News)

LONDON—Great Britain is ready to ask, according to North Atlantic Treaty Organization (NATO) a drastic reduction in the long-range West European defense group vehicle assets here as part.

Officials will not comment on exact figures, but Charles Wilson, top British military writer, claimed in the Sun, day Observer that British chiefs of staff recommended a goal of cut 50 long-range divisions, 5,000 aircraft by 1975. The is about half what Supreme Headquarters (then under Gen. Penetration) and the U.S. played for at Lisbon last spring.

Severe Change. NATO aircraft force is estimated at 25 front-line divisions, slightly fewer "reserve divisions" and 1,600 aircraft.

The proposed reduction in the long-range force is in line with British commitment of the "three-front" and the tight British financial situation. But critics may be the best, because out look but it is obvious from some statements by top officials that France Minister Winston Churchill is concerned the strategic outlook priorities reduced European commitments now.

Here are the main arguments: **Beliefs** behind the maintenance policy have been a big factor in France. In telephone talks, Britain has failed to match the NATO buildup either on land or in the air. Again using Wilson's lead, Britain doesn't think the Russians have added to the 25 divisions deployed at the front of the Berlin blockade—most of which were lost in 1951 war strength. Nor do the British think the Russians have stepped up conversion to jet or force to replace with NATO U.S. As Paris officials note some with the British view, parties and the Soviet is in quantity production of the Mi 25 jet-jet bomber and has far more planes of the type in service than either the USAF or RAF. Russian MIG 15s in France still outnumber

USAF, RAF and RCAF F-56 groups in England and France and, the Russian pilots out, the F-56 is the only NATO fighter capable of dogging it out with the MIG 15 for air superiority.

As Churchill has indicated is about even defense speech over last summer, Britain expects the Allied development to get harder in bringing back the different thrust of the A-bombs, which was lost when the Russians exploded their. The British argue that the Boeing B-47 and the Vickers Valiant, both of which should be well as service by 1955, greatly increase the ability of the Allies to deliver a blow to the Russian heartland.

USAF sources, however, do not feel that the Boeing B-47 Strategic and the Vickers Valiant are counterparts, pointing out that these already use two wings of operational B-57s and that more than 100 of these planes have been built by Boeing. Penetration believes British estimates that the Valiant will be operational with RAF power by 1954 is extremely optimistic. A USAF wing of B-47 bombers is scheduled to transfer to British bases next spring. Two Valiant prototypes have been built and a third is under construction.

Threat Ended. The British expect the A-bomb bomber threat will force the Russians to concentrate more on their air defense at home. In on Penetration believes that, at the same time, the British have no reason to believe the Russians have anything in sight to compete with Allied forces.

But USAF officials have publicly stated the Russians have several types of gas turbine-powered bombers under development to succeed their piston-powered TU 70 copies of the Boeing B-29.

The latest British line led Churchill, as Minister Lord de Tails and Dudley and Defense Minister Alexander to cut out not publicly in recent weeks, was against the dangers of accelerating aircraft development at the expense for lag spending on aircraft production lines.

VISIBILITY



by Swedlow

The BOEING B-57 canisterjet is the fastest known bomber in the world. This great six-jet engine powered, swept-wing bomber will be produced in quantity for the U.S. Air Force by Boeing Airplane Company, Wichita, Kansas, the Douglas Aircraft Co., Tulsa, Oklahoma and the Lockheed Aircraft Corp., Marietta, Georgia.

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On the recent long-hauling Polar flight by Scandinavian Airlines which cut hours from the Wain Coast to Europe, fuel was a major consideration. With only two ways in the nearly 5,000 miles from San Francisco to Copenhagen, the constant accurate measurement of the Douglas DC-4B's fuel supply by the Simmonds Electronic Fuel Gauge was vital to the success of this first flight.

Simmonds revolutionized the electronic fuel gauge on American commercial airlines over ten years ago. Today more than 40 types of commercial and military aircraft are equipped with Simmonds fuel gauges. The Simmonds Precision represents this type of gauge in the highest points of refinement and reliability. The improved microtechnology of the system has been reduced in weight to only 1.12 lbs. and in size to 7 1/2 inches long. It is shock-resistant, inherently for low bulk and greater transmission error. For the sake of accuracy and lightness, it's the SIMMONDS FACTOR.

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PRODUCTION

C-W Naturalizes Sapphire Jet Engine

- Analysis finds British design too cumbersome.
- Wright redesign cuts cost, production time.

By Irving Stone

British designs for turbine and compressor components sometimes lead to production procedures considered laborious by American standards. An instance of this showed up when the Armstrong Siddeley Sapphire turbojet was brought to the U. S. by Cessna-Wright Corp. last year.

When Wright Aircraft's design engineers analyzed the British design for adapting it to American standards, one major part quickly got the spotlight. This component was the center main bearing support.

Control about midway between the inlet and exhaust, the support was a key part of the engine structure. Two transoms attached to it carried almost the entire weight of the engine, also had to absorb all light engine loads.

Cost Estimates—Prototype Saphires made by the British had a center bearing support which literally had been carved out of an aluminum alloy payable forging (36 in. in diameter, 11 in. thick). Before production equipment was used to machine the contoured air passages. About 9 lb. of chips were produced for 1 lb. of finished product.

Wright Aero's analysis indicated that at American labor rates, minimum cost of making the part here from an aluminum customer forging would be \$5,790. Referring this part part would be about 70 lb. of material, that was depositing material on a three-shift basis would produce less than a single unit per month. Also, USAF requirements imposed higher operating temperatures and greater peak stresses than those which the British part had been intended to withstand.

New Approach—A special group was set up at Wright Aero's engineering department. This job:

• Redesign the center bearing support to complex contour machining is eliminated.

• Establish production procedures for fast and economical processing of the part.

• Replace the aluminum alloy with an



BRITISH PART
MACHINED FROM A ONE-PIECE ALUMINUM FORGING

FOR PROBABLY THIS WAS
SEPARATED INTO AN INNER RING,
AN OUTER RING, AND TEN SECTIONS



AS SHOWN HERE WAS
MACHINED FROM ONE-PIECE ALUMINUM FORGING



NEW PART WITH
TEN SECTIONS



MADE FROM ONE-PIECE ALUMINUM FORGING



DETAIL OF PART



DUCTILE IN-RESIST CAST
AND WELDED ASSEMBLY

SAPPHIRE ENGINE center main bearing support was machined from one-piece forgings longer in British design than Wright Aero forgings—with cast cases and center rings, sheet metal struts—broken out and then replaced by solid steel.

trials having greater strength at elevated temperatures.

A quick solution accompanied a breakdown of the part into its inner and outer cast ring separated by 10 steel slugs from sheet metal and welded to the rings. The rings were to be left largely in cast, requiring only limited machining on a lathe, leaving of pins and bearing and threading holes.

Nickel Iron Selected—In the search for the ring material, metallurgical engineers ruled out gray iron because it was too weak and brittle. Working with cast steel was deemed too difficult

to hold the close tolerances required. Nickel iron was chosen—a relatively new material, with both the temperature resistance and the toughness required in the support. (Nickel iron is a development of International Nickel Co.) The material is ductile, bends about as easily as steel and has strength superior to gray iron. It has the carbon content in nickel steel, leaving an almost continuous matrix. This results from annealing of the material with magnesium and nickel (adding a carbon), before pouring. Costs projected on a volume basis



WRIGHT R13-2500 was brought from blueprint to mass production in 15 months. This T-28B11 scout engine powers the F-104F Thunderbolt.

—with the Wright redesign and using nodular iron—was estimated by Wright Aero's engineering team to approximate \$640 for the forgings, \$170 for machining, \$10 for shafts, and \$25 for welding. (This gives a total of \$943—about 1/2 the price for the job starting with a cast-iron block, and about 1/3 of the cost using a practice forging as employed by the British.)

► **Rings.** Cont.-American Inland Steel Co.'s experimental facility, Melrose, N. J., was given the contract to develop a suitable casting technique for the main and outer rings. Some early samples contained surface cracks, and minor changes in the nodular alloy were required.

Boise Steel finally achieved uniform shafts with a high nickel alloy that had a coefficient of expansion to fit the parts bolted to the support—the plate main component housing and stainless burner housing.

Lab analysis showed that the nodular was subjected to maximum temperature requirements. At 2700, the iron base alloy is about as firm as strong in the original aluminum alloy, on the basis of short-term tensile tests. The redesigned support—only about 15% heavier (previous) than the aluminum part.

► **Steel-Wing.** Weld-Fabrication and welding of the strut themselves presented no problems. Difficult job was to work out a method of welding the stainless steel to the nodular iron rings. Wright Aero engineers came up with a 431 stainless steel which was reasonably compatible with the metallurgy of both the nodular iron and the 18-8 steel material.

Welds were subjected to Rayflex testing to evaluate strength under vibration loads. Although deflection of welded struts measured about 0.1

inch, the joint held firm. This was in excess of any vibration likely to be encountered in an engine in flight. Final paving with the welded support was in a test frame to duplicate tube assembly loads. Pressure applied by the hydraulic pack was far greater than the loads that would be encountered in drag, climb and turn. Subsequent inspection disclosed no failure of the welds or connecting webs.

► **Processing.** Five months after the start of the project—March 1951—Boise Steel was producing forgings to a dimensional accuracy of .030 in.

At Wright Aero, the rings were processed first by rough and finished turning of the six passages to a hole size of .015 in., then similar rough and finish turning on other parts of the casting. Shafts and connecting rods—0.03 in. were welded in place, requiring about 25 lb. of filler deposited at speeds up to 2 in./min. Final operation on the support was finish turning, using the put-on drilling and turning beds.

► **Flow in F-104.** Six months from the start of the project, the first center bearing support was ready for installation in a YF104 engine. Test cell trials were satisfactory and the engine passed its 150-hr. model test with a nodular material support. The new assembly also has been run successfully in Republic's F-104.

However, development is still continuing. Aim is to reduce the amount of nickel now required for the nodular material support. Initially it was hoped to use a ferritic nodular (low in nickel) to use an strategic material, but the reduced dimensional changes that could not be tolerated on the air-cool surfaces. The relatively low coefficient of expansion of the nodular also introduced other problems.

At now considered, the nodular material contains three percentages of elements: carbon, 2.7-3.3; manganese, 1.9-2.5; silicon, 2.3-3.5; phosphorus, 0.15 maximum; sulfur, 0.05 maximum; chlorine, 0.30 maximum; molybdenum, 0.35 maximum; and nickel, 21-26.

PRODUCTION BRIEFING

► **Boeing Aerospace Corp.** has virtually completed a new conventional unit building at company's main office in Mukwonago, Ill., which will expand activities dealing with aircraft development and production.

► **Chlor-Alkali of Road Roller Mfg. Co., Detroit**, has opened new sales offices and a warehouse at 15771 Wyandale Ave., Detroit.

► **Jack & Blount, Inc., Cleveland**, received major orders during October from Boeing Aerospace Co. for hydraulic and electric actuators, electric solenoid and electric control panels orders for various uses from the Aerob, Aerospace Co. of Canada. Total orders received during the month amounted to more than \$5 million.

► **Sighelectric Corp., New Rochelle, N. Y.**, has incorporated a new subunit firm, Sighelectric of California Co., at California Airport, Santa, Calif., to manufacture and market Chemalloy metal and various electronic components. These firms were consolidated to form the new subsidiary Electronic Division of Triang Products Corp., Louisville, Ky., Technical Products and Services Co., and Chemalloy Associates.

► **Morse Corp., Dayton**, has been awarded to develop and manufacture test equipment and training devices.

► **Southern Products Co., Pasadena, Calif.**, will move into their new factory building at 1705 So. Mainland Ave., Thorens, Calif., during the first week of January. The company makes Monoball bearings and ball bearings and mechanical pulley-pull controls.

► **Reynolds Metals Co., Louisville, Ky.**, has awarded a contract for construction of its Robert P. Patterson aluminum reduction plant at Andalusia, Ala., scheduled for completion by July 1953, to Detroit-Dickinson-Pelham Construction Co., Little Rock, and W. S. Bellows Construction Co., Houston.

► **Sub-Zero Products Co., Cincinnati**, is the new owner for the Sub-Zero Food and Manufacturing Division, Deepfreeze Distributing Corp. The firm makes metal chilling machines.



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OTHER PRODUCTS WHICH SERVE AIRCRAFT



Family Photo of GE Jet Engines

General Electric Co.'s jet engine development history is telegraphed in this photo showing how the powerplant line has changed and grown.

- **I-A**, first jet plant built in this country, was a centrifugal-flow, experimental engine based on the Whittle W2B. Rated thrust was 1,500 lb, weight was 900 lb. This I-A was installed on the Bell XP-55A, first U.S. jet-powered plane to fly (October 1942).
- **I-16** (J31) was the first axial compressor GE turbojet. Thrust rating was 1,800 lb, weight was 910 lb. It flew on the Bell F-59A and Ryan FR-1 and XP-72R.
- **J33** (developed as the I-40) was first delivered for test in January 1944, and developed a thrust of 4,000 lb. Weight was 1,845 lb. It was installed on the first Lockheed XP-80A. Shooting Star and was first flown in June 1944. Shortly after the end of the war, com-

plete responsibility for the engine was transferred to Allison Division of General Motors Corp.

- **J35**, Engineering and manufacturing responsibility for the J35 (not shown) also were taken over by Allison in 1947 after it had built them in quantity. This engine (also known as J47-100) was the first axial-flow turbojet developed by GE. It was used at 4,000 lb thrust, weighed 1,500 lb. First flight was in the Republic F84, in February 1946.

- **J47** and the J71 units show the sharp transition in configuration from the early designs. The J47-C and -D were tagged with a 5,200 lb-plus thrust rating, the former weighing about 1,700, the latter about 3,000 lb. Weight of a 5,000-lb-plus thrust rating and has a weight of 1,550 lb.
- **J71-A**, largest of the units shown, is the 8,500-lb thrust unit.

designed to give accurate response to wheel load changes and quick, positive spark out. The level wheel load enables operator to watch grading action from the same position from which he adjusts the wheel. Extra accessories which accurate fatigue and show settings are eliminated, according to the developer, Lunda Tool Co., Weyershoe, Pa.

Dip-Brazing Speeds Aluminum Work

A new dip-brazing plant for aluminum parts has been constructed by United Aircraft Products, Inc., Dayton, Ohio.

Reported to be the largest facility of this type in the aircraft industry, the operations was completed in four months to meet production schedules for more than 51 million in annual contracts for aircraft assemblies.

Essentially, the process involves heating the joining material and fusing it with the parent materials by dipping the assembled components in a bath of molten heating flux.

Accessibility to joints is no problem. Heat of the bath is maintained automatically, with all parts brought to the same temperature, eliminating distortion from differential expansion. An added advantage of the process is reported to be walkaway of parts upon ejection, postweld brightness and joint strength, with little skill required by the operator.

In addition to being faster than the hand-welding technique, the process makes it possible to laser parts which could not be hand processed, it is reported. The company cites as example its down the runway speed indicator. Once assembly was dip-brazed in 47 minutes, against a two-hour period which would be needed if hand torch brazing were used.

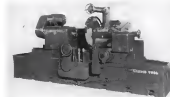
New Copter Engine In Production

The Continental R875-42 radial engine, designed specifically to meet on-try-wing, turret requirements, is in production for Republic's BUFP-2 copter. This new engine model is a refinement of the R875-34 and is the HUPA. It develops 518 hp against the latter engine's 525 hp. Dry weight without oil, water, and exhaust components, air defectors, gearbox and primary system, is 732 lb.

The engine is selected for installation in various copter types. With addition of a small moment of external equipment it will operate in any attitude from horizontal to vertical, give the rotor, Continental Aviation & Engineering Corp., Detroit.

drives are standard, but constant speed is available. The slide under the wheel-head, operated either manually or by power, is a double type to allow for a large amount of bar movement. The double table traverse is adjustable to any desired speed between 3 and 139 in./min.

Spindle table may be adjusted to grind tapered work. Miscellaneous bearings are



Machine Grinds Large Jet Parts

Turboprop engine rotors and other large-diameter aircraft work can be handled on CHW Plan Grinder equipped to grind a gas between small-size standard machines and large, heavy-duty units.

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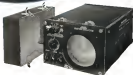
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Alcoa's new 15,000-ton forging press recently went into operation at the Cleveland Forge Shop. An important addition to the country's largest stainless forging facilities, this new press will form larger and more intricate structural shapes. It is the first step in Alcoa's "big press" program to give better service to America's aircraft industry.

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present "Dutch Roll" as a condition of the roll. This is a specialized approach, directed at one aspect of stability.

Flight Research's work amounts to complete measurement of present methods of controlling aircraft.

These systems are not to be confused with autopilot controls which correct and bring the plane back to a pre selected attitude, altitude and heading. Aircraft stability controls are designed rather, to make response of the plane to any adjustment of the controls, whatever it may be, as nearly perfect as possible, without hunting. The pilot has little need to correct or adjust after initial movement of the controls.

Council says it has achieved a degree of stability and control in actual flight that is in sharp contrast to experienced in conventional flight.

Rocket Papers

Trends, data and techniques of rocket science were reported in 25 technical papers and speeches at the recent seventh annual convention of the American Rocket Society in New York.

Experimental work shared the spotlight with theoretical studies in subjects which ranged from rocket motor combustion and instability to the use of small light-carrying rockets for establishing a large satellite in orbit. Because of their present interest and significance for the future, American Rocket Society is printing technical summaries of some of the more important papers. The first group follows:

► A Survey of Combustion Instability in Liquid Fueled Rocket Motors. R. S. Levine and R. W. Lachord. North American Aviation, Inc.

Steadiness of propellant motion within a rocket is a necessity for reliable controllability and accuracy. Combustion instability is a recurrent problem in the design of rocket engines, especially in the last two of each engine. Deviations may result from mechanical failure following instability or because due to fuel back flow transfer rates. In certain respects, it is possible that chamber pressure fluctuations can be less than one-half of a percent of the average chamber pressure, but this is exceptional. A 10% variation in thrust is chamber pressure is sometimes considered acceptable and in such instances the fluctuations are approach 100% of the average thrust. Four classes of combustion instability are discussed.

- Propellant flow fluctuations created by combustion time delay (50-500 cps)
- Propellant flow fluctuations created by control system instabilities (up to 50 cps)
- Acoustic resonances of the combustion chamber (100 cps and up)
- Instability of combustion in starting (40-1,000 cps)

The authors expect much progress in this field as the new data so that it may be possible to eliminate combustion in-

on the land



on the sea



in the air



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AVIONICS

Sperry Cutoff Monitors A-12 Autopilot

- Irregular conditions bring unit into play.
- Tests over, device is in limited production.

By Philip Klein

Sperry Gyroscope Co. has disclosed the inner workings of a device which will automatically disengage the A-12 autopilot in the event of a malfunction which would apply a sharp pitchwise maneuver to the airplane.

The automatic cutoff has completed its prototype development and is being tested in limited production.

►What It Does: The Sperry cutoff is designed to disengage the A-12 under either of two irregular conditions.

• If the autopilot suddenly develops an "unexpected" pitchwise control signal, i.e., when the airplane is not pitching up or down.

• If the airplane starts to change its pitch attitude and the autopilot fails properly to develop a counteracting control signal to reverse the airplane.

The airplane's pitch rate is monitored by the device's most critical and will be the last to get cutoff protection. However, the device developed both by Sperry and by Lear (Aviation Week Sept. 3, p. 42) can be applied to all three airplane axes if desired.

►The Need: Although military aircraft have a need for autopilot cutoffs, the need is more acute for commercial aircraft. The need for increased protection. Certain types of autopilot malfunctions can put a low-flying airplane into a dangerous attitude before the horizon picture normally disengages the autopilot. This has probably happened in low altitudes of autopilot approach complex for instrument landings.

Development of automatic cutoff, started at Sperry in 1945, was spurred by several airline accidents in recent years where the wings of airplanes pitched to the autopilot, although the pilot couldn't be moved.

►Development: Documented—Sperry gave this writer a graphic demonstration of the operation of the new cutoff, using an analog computer equipped with a high-speed recorder, which Sperry has set up to simulate a low-engine situation. Sperry normally feeds the instrument servo output torque on an amplifier to



AUTOPLOTT CUTOFF consists of amplifier (left), two small accelerometers (right).

attempts to that the servo cannot detect the airplane sufficiently to put more than a one G movement (all directed to normal gravity) load on the plane. The servo used as the analog computer demonstration had no such safety limit so that the simulated action pulled away. As then could be achieved with a limited servo output.

With the cutoff disconnected, Sperry's Dr. George Arthur explained a sudden (0.2 sec. rise time) autopilot acceleration. Within a second the recorder showed the airplane was pitching 10 degrees (all directed to normal gravity) and was raised up almost 15 degrees. On an instant, this could cause serious passenger injuries.

Dr. Arthur then connected the cutoff and introduced the new simulated fault. The cutoff disengaged the autopilot so quickly that the airplane pulled only 0.15 Gs and rose up only 1.4 degrees.

►Three Components: The Sperry set of controls of three components: • A small amplifier containing two vacuum tubes and two relays.

• Two linear accelerometers, so located and connected that they measure angular acceleration about the airplane's pitch axis. (One is located in the airplane's nose and the other in the tail; their output signal windings are connected in series opposition to cancel out signals resulting from vertical oscillations of the airplane.)

►How It Operates: Because the Sperry cutoff uses accelerometers, there is a popular misconception that it won't disengage the autopilot until the airplane has begun to "pitch vertical Gs."

This is not the case. The accelerometers provide essentially a "pitch rate" signal used to determine whether the autopilot has gone around to apply a voltage to the servo motor.

The small amplifier continuously compares the autopilot-generated voltage applied to the servo motor with the voltage generated by the accelerometers. If either signal exceeds without a corresponding signal from the other, the amplifier "decides" that something is wrong and instantly disengages the autopilot except under conditions to be discussed later.

For example, suppose that the autopilot amplifier suddenly develops a signal which would cause the servo to pitch up—climb. The amplifier should at that instant be picking downward and the accelerometers should be generating a proportional "pitching down" signal. These two signals are compared within the cutoff amplifier. If they are equal and opposite (in polarity), they cancel, and the autopilot remains on guard; if not, the autopilot is instantly disengaged.

►Uncertain in Imbalance: The accelerometers signal is particularly sensitive during flight in turbulence or, according to P. H. Hager, head of Sperry's flight control engineering department. Sperry is a proportional "light" autopilot control, which means applying sufficient and rapid corrective elevator motion to prevent any appreciable departure of the airplane from level flight.

In turbulent air, long-term applications of variable corrective signals may be necessary with a "high" autopilot. There can be such applied. The

28

passenger

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per plants unit as long as the work function requires that such signals are needed to maintain the airplane in level attitude.

To demonstrate the stability of the A-12 in gusts on, and the fact that the accelerometer signal prevents the cut off from falsely designating the autopilot as excessive turbulence, Sperry made another windtunnel run.

Approximately every two seconds the system encountered a 1/2-in.-diameter, 6-in.-long, equivalent to a 10 ft/sec gust. Gust sharpness or rise time was varied between 0.1 to 0.5 sec. The automobile contained the sensor

local within better than one degree at all times, at no time did the motor decrease the autostep.

• **Wasn't Catch AE**—The Sperry estate will not respond to those subplot conclusions which came a very close to plane-pitching maneuvers as "defect." (The same is believed true of the recently announced Lear F3 estate.) The reason in Sperry's case is that the cut-off went beyond to "prove" common maneuvers introduced by the human pilot.

When the autopilot is performing its stabilization task, its signal to the servo is of opposite polarity to that generated by the accelerometer, because the autopilot is opposing the maneuver being executed by the accelerometers. When, however, the human pilot introduces command maneuvers through his manual controller, the servo signal is of such polarity that it adds to, rather than cancels, the accelerometer signal.

• **De-centralised**—Sperry's solution is to decentralise the control supplier so that it will gather a small cross village (big house can of assets and acknowledge signals) but will respond to a large cross village which would cross (or indicate) a sharp, sudden movement. Command operations are normally introduced much more slowly than anticipatory stabilisation measures. Hence cross



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nessed countries give a well served side up (and that's just relative) to which the local people may suggest a party or gathering involving the state. The Australian Embassy in Washington, D.C. has a resident staff member in which the place went into before the plane opened to be damaged by hijacked American Airlines, and it is possible that the state pilot authorities initially issued a side pitching maneuver which the call off first interpreted to be a command maneuver.

Catapult amplifier sensitivity which will permit normal pilot workload measurement is determined for each type of aircraft by flight tests. This sensitivity is then put into the amplifier front panel by means of two switches.

► **Matching Networks**—Under automatic (non-manual) autopilot operation, the stick/elevator signal voltage must be "duped" so its magnitude is always equal to the autopilot servo voltage for any amplitude and frequency of airplane pitching. An integrating network is designed to take care of this function.

Another novel feature is the signal switching by advancing the phase of the integrator as a voltage within the control amplifier.

► **Autobalancing**—Each of the two identical accelerometers consists of a laser transposing device which uses magnetic damping to give a 30-ppt natural frequency and a 0.507 damping factor. The accelerometer element drives a

By matching one accelerometer to the nose and the other to the tail, Sperry gets a long moment arm to "amplification." This gives a high signal to noise ratio and eliminates the need for close matching of the two accelerometers used. Sperry says any two accelerometers can be paired up without special selection.

- **Easy Maintenance**—Sparty has designed the amplifier with an eye to easy maintenance. Significant internal amplifier voltages can be measured across the front panel through an access door which exposes sockets into which voltage probes can be inserted.

• **Reliability**—Sperry has demonstrated one source of failure by substituting long strings for alphanums and brackets in the system used in early seedcomester. This illustrates the possibility of seedcomester signal interruption under worst situation or turbulence. However, if the signal from either of the seedcomesters should be interrupted or lost in other manner, the owl will diagnose the miscount.

The use of vacuum tubes in the Spray-coat® raises the question of what

Valve Talk

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Erp. Administration: 1970/1971

Seneca Falls, *Archie's Western News*.



Everything is laid on the line at a Whitaker control panel meeting . . . everything from price to policy.

The meetings are held every Friday morning. A score of shirt-sleeved men fan the room with cigarette smoke as they talk their way through the week's problems, and when they adjourn they've got the answers. The sessions are conducted by Vice-President Glenn Whinnier and moderated in final decision, and with dry humor, by Executive Vice-President Don McDermott.

answer is referred.

Near all questions before the panel concern the subject of revenue. Cost accounting may prove to be that cost for certain items have gone down because of volume production, and that Price Engineering has requested a price cut for the customers. This is granted. Then, 300 added discussion minutes will be devoted to controlling a price.

All departments of the value chain are well represented: manufacturing, engineering, new technology, product development, production control, field engineering, outside production, contract subcontractors, scheduling, business engineering.

Finally, I was surprised to learn that Windows doesn't charge all the trouble will bear when its values—originally turned down for too expensive—are later bought frantically to meet an emergency.

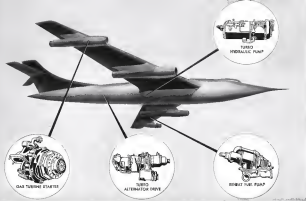
They know exactly what a design will cost in every production case.

Such top men as Art Buchwald, president, production, Joe Gruber, vice president engineering, Larry Rabinowitz, secretary, and others, all agree that the company's success is due to their own leadership. Rabinowitz explained all problems they foresee, pointed out good and bad features as far as their departmental responsibilities are concerned.

"Typical comments:

"Well, if we don't use the master logo during the 'WB 690-3H' we can let damn it sit and cost... [production] looking good to me really but maybe the package stop here because the first time I saw it was like, 'What's that?' and you'd say, 'That's how they are with a shop brand.' Have also

Glenn? Not a bit. Each idea is held around and discarded or fit into place with a verbal shoe-horn until a satisfactory composite



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Kaiser Aircraft Corp., Wichita, Kansas, says that the Tinnerman fastener is a major factor in reducing weight and increasing strength of aircraft structures. The fastener is used in the fuselage, wing, and tail sections, and is particularly useful in the fuselage and tail sections where it is used in the fuselage and tail sections.



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vibrant, and protection of susceptible design has been formed by Major Vandenberg and associates, all directly with North American Aviation. Major Vandenberg will include amplifiers, voltage and frequency regulators, pulse generators, frequency dividers, and low level signal converters. The instrument must lead to other reports that NAA has played heavily into many amplifier developments for use in its new instrument systems work. (Major Vandenberg, 310 Kansas St., 21 Sparks, Calif.)

• **SADOC Goes to Wind-Consolidated Engineering Corp's** new analog-to-digital computer, SADOC, has gone into use at White Sands, N. M., Foreign Ground to transfer analog test results. University of Southern California and the Navy test station at Point Mesa have SADOCs on order. Consolidated reports.

• **Colson Sells First Transceiver-First order for Colson Radio's** newly announced 144-channel HF transceiver (American Voice Sept. 15, 1952, p. 48) has been received from Linc, Inc.

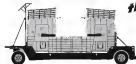
• **New Avionics Components** • Temperature-stable capacitors and coils, only a 0.1% change in capacitance from -80 to 200°C are available in new line known as Stables D. (In Central Condenser Corp., 3245 N. Cold Ave., Chicago 16, Ill.)

• **New shielded capacitors.** International Electronics Co. has added a new line of low-leak (0.12 to 2.2 mfd) shielded capacitors. IEC says the units have "exceptionally high Q" and a maximum variation of 20% from rated capacitance. Units are made in IEC's type HTS container (1 1/2 x 1 1/2 in. dia.) and the company says they meet JAN C10A, temperature coefficient and loadability requirements. (960 North Broad St., Philadelphia 5, Pa.)

• **Ultra-miniature relay.** A small, low-powered, plug-in type contactor has 9- and 15 milliwatt sensitivity in SPST and DPDT styles, respectively. Known as the Sctos 4000, relays are available in coil resistances up to 50,000 ohms, with other series or pilotless contacts capable of handling 11 and 1 amp respectively. (Advance Electric and Relay Co., 2915 No. Nimitz St., Burbank, Calif.)

• **Proton carbon-fiber resistors** are now available in two lines and reported to be stable to 0.01% under all common environmental conditions, is sealed in bellows-filled glass envelope. The other, a less expensive unit, which is a ceramic tube, is called "such more stable than varnished resistors under high humidity and temperature conditions" by the manufacturer. (Chas. Brainerd Co., 9 River St., Warrington, N. J.)

-PK



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FINANCIAL

Beech Corp. Billings Triple in Year

The year's sales were \$91 million, compared to 1951's \$33 million, but taxes put brake on company's net.

New poster poles in sales and earnings were recorded by Beech Aircraft Corp. for its 1952 fiscal year. Total sales for the year ended Sept. 30, 1952, totaled \$90.9 million, nearly three times the \$33.8 million in billings for the 1951 fiscal year. Income before taxes for the current period reached \$4.9 million, or some 3.5 times greater than the \$1.4 million reported in 1951. Since, however, adjusted 1952 net income to \$1,682,734, or slightly more than twice the net income of \$737,426 shown for the 1951 fiscal year.

A review of Beech's historical record reveals that the company's 1952 accounting surpassed billings of every year, except one, even during the war period. The exception was 1945 when sales aggregated \$121.8 million. Net income after taxes for 1952, however, was exceeded in 1945, 1944, 1943 and 1940.

This is nothing more than a reflection of increasing profit margins throughout the industry and the heavy toll exacted by taxes.

Effect of Taxation—Beech's profit margin on sales before taxes was 5.94% in 1952 compared with 4.75% in 1951, showing an improvement in earnings productivity. However, profit margin after taxes, contrasted to 1.86% for 1952, declining from the 2.24% indicated for 1951. As a result of this loss, in 1945 and 1944, when sales represented the 1952 expenditures, profit margins averaged 8.7% and 3.5% respectively. After taxes, the profit margins, while reduced to 2.5% and 2.4% respectively, were higher than the 1952 showing.

Earnings for the 1952 fiscal year were equivalent to \$2.52 per company share on the 390,503 shares outstanding, comparing with only \$4.75 per share for 1951. Total dividends declared for the 1952 fiscal year aggregated \$3.85 per share as against only 80 cents per year during 1951 and 1951.

Once again a quarterly dividend rate of 25 cents a share has been announced and follows the pattern prevailing during 1949 and 1950. (The new quarterly rate was established on Oct. 1, 1951, when an extra dividend of 20 cents a share was also declared.)

• Beech's Business—The large sales vol-

ume of 1952 was established through the delivery of Beechcraft Bonanzas, Model 18 twin-engine transports and Vee-Bonanzas.

A large percentage of these deliveries represented the accumulation of Beechcraft planes built prior to and during World War II, for the U. S. military services. In addition, the company, in a major subcontractive, built a large number of disposable wing tanks, engine tank tanks, skins for the Boeing B-47, wings for Lockheed trainers and fighters, and jet engine starting units.

Design and experimental work on new models were reported as being eased on an aggressively while production volume on the post "stand-by" was taxed.

The engineering design of the T-34 single-engine trainer was reported to be practically completed. "Gnat" design was indicated as concurrent with the design of the T-36A twin-engine trainer, the prototype of which is expected to fly early in 1953.

In order to provide for the production of the T-36A series, a new assembly building is now being constructed for this purpose on the west side of the company's main field and is expected to be ready for occupancy about March 1953. This construction is being largely financed by a federal mortgage loan of \$1 million, thus avoiding dilution of the equity.

The company's net worth position reached a new all-time peak at Sept. 30, 1952, amounting to \$18,251,962, or \$47.09 per share. This compared with \$4,919,337 at \$14.67 per share a year earlier.

To facilitate financing its expanding operations, Beech, on June 30, 1951, arranged a revolving credit of up to \$20 million under the Vison program. That credit expired July 1, 1952, but \$13 million had been borrowed at Sept. 30, 1952. The Vison agreement was amended on May 1, 1952, to permit the loan of a special fund up to \$1 million to finance the new assembly building now under construction. At last reports \$780,000 of this fund was drawn down.

The Vison program provides needed funds to finance the large investments required for production facilities. For example, at Sept. 30, 1952, investments

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G-E silicone during common tubing, everything but not to admit and de-aerating system in the F-46. Solve Jet its temperature resistance (-85 to 500 F) provides a high safety factor. Connection shown made by Aeroquip, Inc. for North American Aviation, Inc. from G-E silicone rubber 55 13

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NORTHEAST

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Northwest started operations in August, 1933, with only two second-hand, 11-passenger biplanes, three mailboxes, three pilots and a total capital of \$10,000. During the 6 months of that first year, Northwest served 1,904 passengers, flew 239,000

passenger miles. . . . Nineteen years later, during the first five months period of 1953, Northeast carried 150,024 passengers and logged 25,042,324 passenger miles with a good fleet of fast, dependable Constellation and DC-3's. . . . In the early days, the airline showed typical Yankee tenacity in its unswerving determination to bring commercial air travel to the New England area, overcoming such obstacles as airports which were merely local pasture lands staked off to show the local county, and, except for Boston, totally lacking in roads and navigational aids, weather bureau, or facilities for night flying. . . . As requirements were gradually brought about, Northeast Airlines grew and prospered until now its flights extend from New York to Montreal and to 33 cities in the New England states. Like other successful airlines, Northeast depends upon Bendix® Radio equipment.

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LETTERS

Soaring Recognition

Your recent coverage of the World Club Air Competition at Madrid, although good, failed to convey the true picture.

First, in fairness to those exhibitors and governments, it should be mentioned that the Soaring Society of America did make support from several exhibitors who provided funds and other equipment.

It should also be mentioned that the Mustangs Aeromarine Corporation provided transportation for Erik Johnson, his son, son, Earl Bailey, and the wife, Mrs. We believe an equal amount from other club governments would have made a large difference in the outcome of the competition.

You might have mentioned also that Johnson designed his ship as a glider on the last day of competition. Due to high winds, these sailplanes were completely washed out of the event on that day. Johnson lost two flying days at a result of this policy.

Your readers probably would have better appreciated the elegance of the RJS 5 autogloss had you reported the results at the last day's competition. This was a point to point race 10 mi. from Madrid. Johnson in RJS flew the route in 1 hour 8 min. McCordy flew this course in 1 1/2 hrs. while Johnson in a Schweizer 113C and Wils, the winner of the competition, took 1 1/2 hrs. more than Johnson to fly the course.

However, your regular staff did bring out the fact that a complete staff in such a competition. In my opinion, however, you are not a complete staff. But some commentators, not our airline crew, as in together for each team, and several others for the repeating descent and maintaining the airplane. Had we a good comment at Madrid, Johnson would not have lost the two flying days he did.

Almost all things we have learned a lot from our experience at Madrid and we are sure your readers that we now know how we could do a better job at the next competition.

ARNDT RASTET,

Chairman Scientific Committee
Soaring Society of America
Montgomery State College

Your recent article in the World Soaring Championships was very good and quite accurate. However, by way of giving credit where credit is due the following points should be clarified:

1. Mr. Jon Cramer of Dallas is the Soaring Society of America president. My Paul Schweizer is the secretary.
2. William Smith and Shirley Charles played archery—not fourth—in the product category. And they flew a Cessna 441, Spanish built. Kenneth H. that the latter company graciously loaned it, so not, in the smaller product class, U.S. built.
3. Shirley Smith, flying a Schweizer 121, was not in last place but that is a

field of 40. He and Richard Johnson lost valuable points while grounded due to inadequate ground support, which, in my opinion, was a U.S. discomfiting and not the responsibility of the Spanish organization.

Most of the two-hour sailplane was Kenneth H. (former design). The Cramer entered two Cessna 441's (two Kenneth H's and a Mo 15C (all hand made designs).

To some of us in amateur flying, who are passionately better known as general fliers and casual reports of aviation, the subject, sophisticated and even sophisticated that gliding and soaring interest in this country are already respectable. Without going into the problems of domestic flying and high performance soaring, the sources of support for the various teams at Madrid are quite revealing.

As you stated, some nations were supported by their military members, some by consular or partial governmental funds of money, services and/or equipment to their civilian organizations, and the remainder varied substantial countries. In the United States and Australia—as was the case with the British team.

We were the exception. Government (including military) backing and aid was more quiet support to see the acceptance of the U.S. organization in other than the actual racing department, which was reported in the last. In contrast to this was the obvious comment at Madrid that several nations were in the championships, and heavily equipped, only because of U.S. aid.

Not the least of the problems in American soaring at the center of going from recognition. Although considerable space is devoted to the subject of soaring, the best efforts in this country, including mostly records, are not reported by the F.A.I., are rarely at least in print.

As an example, a few months back American soaring set a record at 20,000 ft. in a helicopter climb record of some 27,000 ft. The same year, in two hours, almost did a sailplane in California topped 42,000 ft. Apparently, by now many of its little airplanes for an aircraft without power plan to attain 41,000 ft. more altitude than a powered aircraft.

WALTER SERR

1111 South Coast Blvd.
Upland, Calif., Ca.

From a Navigator

I think that in most of our modern, American Wreck is known in one of the most independent and up to date aviation papers in the world. With this recent publication of your article on Seaboard & Wreck's experience (by George Christian), I feel that . . . you have received advice regarding a good service. I thank you in the name of the President and the members of NACB for the publication of the article.

Fred Warrick, Navigator
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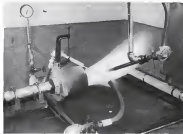
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Flexible Hose Survives Trial by Fire



FIRE RESISTANT Aeroquip double braided hose withstands 2,000°F torch flame while carrying 1 gpm of SAE 20 oil at 1,700 psi.



FLEX JOINT for rigid tubing will find application in the B-47, where it will communicate fuel lines to the Straker's 20th wing defectors.



NEW FITTING

(Bottom sketch) fits into hose lines tube, housing and against positive and negative pressure. OM-type fitting B on top.

- Aeroquip demonstrates equipment at meeting.
- New joint and fitting are also presented.

By George L. Christien

Jackson, Mich.—A double-wire braided flexible hose that can withstand 2,000°F heat and high pressures for long periods of time was demonstrated here at the Air Transport Operators' Conference sponsored by Aeroquip Corp.

The demonstration was conducted by Aeroquip to compare its products' behavior with requirements for propellant-delivering hose, suggested by the Civil Aeronautics Administration representative at the meeting. The representative thought flexible hose in use 2 1/2 ft between engine cylinders and the fire wall should meet these conditions:

• Single-wire braided hose—One minute at 1,500F, 150 psi pressure, 0.4 gpm of flow, followed immediately for 10 seconds at 1,800F, 1700 psi, 1 gpm flow.

• Double-wire braided hose—Four minutes at 1,800F, 150 psi pressure, 0.4 gpm, followed immediately for one minute at 1,800F, 1700 psi, 1 gpm.

• Vent Braid—The single-wire hose met the requirements, except that in the high-pressure part of the test, it failed at 15 seconds, instead of 10.

The double-wire hose far exceeded test requirements. The first part of the test was conducted at 1,500F, raised to 1,800F, in the high-pressure part of the test, the hose remained intact, although scorched, after 54 min. instead of the required ten seconds, then the temperature was raised to 2,000F for another four minutes at which time the hose did not fail.

Standard Aeroquip hoses were used in all tests, with three protection around the couplings and adjacent portions. SAE 20 engine oil was used, hose size was No. 38 (1 in. o.d.), test was held on section from the hose and coupling, and flame impingement covered a six-inch length.

The CAA man found his suggested requirements on the belief that one minute was the maximum delay to allow for fire detection and 10 seconds is approximately how long it takes to trigger a prop.

• Tight Fit—Aeroquip, which claims to

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Chrysler Siren Engineers stand ready to assist any community in planning its protection. For additional information on the Chrysler Siren and the protection required for your community, write: Dept. 372, Siren Layout Service, Industrial Engine Division, Chrysler Corporation, Detroit, Michigan.



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have assigned the idea of equipping flexible hose lines with detachable, reusable fittings, have come up with a new one: the "Little Guss." Previously, fittings clung to the ends of hoses by compression of the hose. This was not satisfactory with high temperatures, where hose kinked and fittings tended to leak.

The new fitting takes into the hose's inner tube, fastening a lip which seals effectively under negative as well as positive pressure. Aeroquip says the new design will minimize its seal until the hose (and in this case the lip) becomes totally completely hard from heat action.

The fitting may also be used with hose components unsuitable to one position. It may be assembled and disassembled in the conventional manner. Aeroquip has also developed a new conversion engine hose which it tests with the Little Guss fitting. The new hose consists of an inner tube in which is installed open-end pins to bend.

This is covered with clonchless wire braid. Result is a weight saving of up to 40%. Hose is designed for high ambient and fluid temperatures. In a test, the old-type fitting began leaking at 230 psi. The new type held until the hose burst.

Flex joint—Aeroquip has under development a novel type of flex joint, the first series of which will go into the Boeing B-47. The Shrinkjet's 202

wing deflators need such flexible and accurate air feed lines.

The flex joint can deflect 180 deg to offset side of center and stands 1/16 in. oval displacement.

Advantage of the joint, according to Aeroquip:

- No special preparation of tubing is required. Use of a new type bonding character used for special hose preparation, such as fitting.
- Tightening is simple, such two Allen screws are used, eliminating need for large tools which might be difficult to get into cramped quarters.
- Joint can withstand 127 psi. (frequency now being 510 in. 1968) from 20 to 200 psi.
- Joint is relatively light.
- Hydroscopic—Aeroquip's electric line a hydroscopic was on exhibition. The portable instrument is described as "a lightweight electronic instrument... to indicate and record high-speed pressure phenomena incident to the operation of hydraulic systems." The pressure pickup is a stainless steel.
- Aeroquip lists three features for the Hydroscopic and its pad up:
- Records remote and instantaneous character of pressure fluctuations on an oscilloscope. Traces may be photographed for a permanent record.
- Detect static calibration, lower with pressure and control.
- Integral temperature compensation.
- Response to high frequencies and high rate pressure changes.
- High sensitivity. An element designed

for continuous service at 3,000 psi will indicate impulses from 0 to 20 psi.

• Negligible hysteresis.

• Elimination of vibration, rattle and service effects on adjacent tubing.

Observations are easily observable on the Hydroscopic which could not be read on conventional hydraulic pressure gauges, because of speed of needle movement.

General Comments—Airlines offered these comments on various hose applications:

- Fuel Injection hose. American, United and Delta are interested in the use of Aeroquip hose over their in fuel and two vehicle lines on the Wright J350 CA, BD and CD engines. All three airlines will just get R3550 on their DC-7s.

TWA reported the certification work very well. On arrival test, it has gone through two engine runs successfully and the results are now on its third test run.

Eastern, which resembles the hose in its hydroscopic shape, says it has a program to bring a plane back to its main wheel line base at Miami's case of right tube rupture.

Chicago & Southern follows same practice.

Operating pressure of the fuel injection system were quoted as 735-750 psi with peak stage pressures hitting 2,750 psi.

Aeroquip suggested that many flex hose lines instead of rigid tubing steel lines helped down on these peak pressures to the benefit of the entire fuel system.

Carlin Wright is currently reviewing the flex line installation. All C-130s engines receive all the new electric line for TWA are further equipped. CW has approved the flex lines as an emergency replacement time for rigid lines.

Life tests. National has replaced all flexible, braided cable housing main lines on its life with Aeroquip hose. results are excellent, says the airline. Harco, above for direct use that braided cable has some conditions limited, preventing release cable. Aeroquip has several such modifications, according to National.

Eastern has had the same results and suggested that Air Canada, member of the life tests, adopt Aeroquip hose as standard equipment.

Electrical & Skydial uses. Use of Aeroquip hose in electrical cable conduit in areas where weight is exposed to Sky Jet fuel was suggested. It would also be very useful in the present difficulty in pulling wires through rubber hose, the conductor was held.

Conclusion chairman was R. C. McGinnis, American Airlines. J. Henry Renner was in charge of arrangements for Aeroquip.



PAAT 240s Get New Stratos Supercharger

A new Stratos turbo supercharger is being installed in PAAT American World Airways' fleet of 15 Convair 440s. Full order in the 23 units, says Stratos.

The new unit, Model 5601A, was designed to meet FAA requirements, in clearing these:

- V-type mounting flange to expedite installation or removal.
- Shallow duct changing requirements on inlet and outlet of the unit.
- External supercharger oil lines have been replaced in internal, drilled passageways, except for two lines to the pilot's vented oil tank.

Unit also incorporates a "hybrid" gas mass, designed to pass out impeller over-speed.

Major housing configuration changes were made to allow the unit, which supplies 62 lb./hour of air, to be installed on the 1-43 cylinder engine of the Pratt & Whitney Aircraft R2500 engine which powers the Convair 240.

The supercharger was developed from the basic Stratos Model and embodies many of its features. It was flight tested on less than a week, says the manufacturer. The last newly equipped 240 in service and the entire fleet should be converted by the end of the year, according to Stratos.

OFF THE LINE

Moments Cleaned is putting out two new non-flammable hydraulic fluids CTS 40 and CTS 45. The former, in various viscosities, will meet existing fluid needs up to MIL-5608. CTS 45, a high temperature fluid, is available in development quantities at the development price of \$30 a gallon.

Hydraulic pump-driven ground cooling fans on the Convair 440 are very noisy, while people say. Aeroquip may have to install the fans to reduce the noise. The company is also studying an improved gearbox for the installation.

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THE PROP STRES THROUGH

For American World Airways the propellers fully assembled to its stations in Europe and the Middle East from its London maintenance base, using more than 40 man-hours at a ship. The assembled prop is mounted horizontally on a kangaroo pedestal in the forebay of PAAT's major DC-4. Stockholm now window is replaced with a

sheet of chicken in which a slit is cut to accommodate the prop blade. Another slit is cut in one leading edge to take capstan blades. Being 173 prop pistons 10 in. on each side, DC-4 prop 10 in. on one side. Recent flight tests indicated that the blade sticking into the window did not affect the DC-4's flying characteristics.

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NEW AVIATION PRODUCTS

Unit Measures Slight Pressure Changes

A sensitive pressure measuring instrument that will respond to the difference in atmospheric pressure caused by a slight change in altitude may have important use in aircraft or in applications associated with aircraft.

Developed by Fischer & Porter, this unit is as accurate as the most sensitive pressure measurement known, the fine chain, but is far more rugged and convenient to use. The device, called the Para Cell, is portable (3 in. diameter, slightly over a foot in length), temperature-stable, and is said to be further unaffected by vibration or sounding pressure.

One possible airborne application would be for precision altitude measurement, to give greater bombing accuracy.

To take advantage of its sensitivity, the instrument has an inverter, or over long scale to make minute changes in pressure easy to read. Despite the relatively small size of the unit, the scale is 20 ft. long; a tape, distance after printed on 85 mm. film strip.

A 1/16-in. external on the scale represents only 1/10,000 of the full pressure range at the device. The scale winds back and forth on two spacers spaced two inches apart, between which the window for viewing is located.

Speed of movement is synchronized with the action of the pressure liquid in the mechanism. This mechanism is actuated by a set of extremely precise metal capsules, heart of the instrument.

Fischer & Porter Co., Hoboken, N.J.

Stubby Drill Chuck

A new drill chuck made by Continental Tool Works greatly increases the total life of drills used in multiple-head presses, the manufacturing process. Known as the Continental Stub Drill Chuck, it projects a minimum distance from the head to allow use of short

drills in rigid spindles. Continued use of the setup increases accuracy of drill work and reduces periodic sharpening. Use of short drills also eliminates the need of toolings and fixture plates. Friction drive is added by a U-shaped key in the chuck that fits into notches on the drill shaft. The key also is a safety lock that prevents the drill from being pulled under loading pressure into the collet.

Continental Tool Works, division of In-Cell-O Corp., 1280 Oakland Blvd., Detroit 12, Mich.

Multiple Switch

New switch assemblies that may include as many as 10 separate switching elements actuated by a single lever are being produced by the Motor Division of Minneapolis-Honeywell Regulator Co.

The three-position switches are precision types designed primarily for pilot control control in aircraft. Each switching element is rated at 16 amp. at 120 v. a.c. and will handle 30 v. d.c. inductive loads at 50 amp. at sea level and 6 amp. at 18,000 ft. altitude.

Motor Division, Minneapolis-Honeywell Regulator Co., Princeton, Ill.

Servo Generator

A miniature d.c. generator for actuating automatic mechanisms in aircraft control systems has been introduced by Globe Industries, Inc.

The generator has sufficiently high output to provide good sensitivity. It is featured by the firm to be especially useful at a one device to serve

CONVAIR P5Y Uses

NEW LORD TURBO MOUNTINGS

To Isolate Vibration of 22,000 Shaft Horsepower

This is the world's first between water-based aircraft. The Lord Turbo Mounting can be fitted to the vibration of 22,000 shaft horsepower. The unit is designed to isolate the engine from the structure through the use of 8 Lord Mountings on each of the 8 gun booms.

The Navy's new P5Y water-based aircraft is used for long range search-rescue and anti-submarine patrol missions. The world's first turbo-prop water-based aircraft is equipped with the world's first Lord turbo power plant mounting. . . . A typical example of the manner in which Lord experience and research serves manufacturers of aircraft. Lord Engineering capabilities team up with precision manufacturers to protect aircraft, to lengthen engine life, to increase crew comfort and alertness by isolating destructive vibration and shock. Regardless of the industry in which you are battling with vibration and shock, it will pay you to call on Lord Engineers.

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Portable Kray for industrial work centers tube and other high-tension pipe in single all-welded steel tank, making it compact enough for one man to carry into work spaces formerly inaccessible, says engineer, Halger Andaciano, Inc., 703 Market St., San Francisco, Calif.

World's First Delta Bomber

In one year, the Hawker Siddeley Group have now given the R A F its first day interpreter, the Hawker Hunter, its chosen night and all weather fighter, the Delta using Glanville Javelin and now a key weapon of retaliation in case of attack, the Avon 450. Here is proof indeed of rapid leadership in letters.

Hawker Siddeley Group

PIONEER... AND WORLD LEADER IN AVIATION

[illegible]

ATA Rejects UAL Coach Safety Charges

- Airlines to continue their expansion plans despite Patterson's arguments against high-density seating.
- Evacuation tests show coach passengers can escape safely; but United cuts back its DC-4 seating.

By Lee Moore

Air Transport Association has rejected a charge by W. A. Patterson, United Airlines president, that coach seating is unsafe.

ATA president Emory S. Land sent a letter to CAB stating that 18 major airlines—all the scheduled coach operators—have recovered the present CAA/CAB airline standard of high-density seating and found it safe and reasonable.

Land is that the airline public will continue their rapid acquisition of coach service.

United, however, has cut its DC-4 coach seating back to 54, whereas CAB requires DC-4 capacity of at least 64 passengers to justify the coach fare economically. CAB Rules Division officials oppose granting United permission to change a "successor" two-section between-coach ratio of 4 to 41 seats and "standard" fare of 6 to 41 seats a mile. A middle fare would confuse the public, the rules officials say, because the difference between coach and standard service already is quite vague.

If Patterson sticks to his order against high density seating, and if he succeeds in persuading United faces the probability of either getting out of the DC-4 coach business or finding a way to modify the planes to meet both the CAB requirements of high density seating for coach fares and Patterson's idea on aircraft safety. Since Patterson apparently opposes four-seat seating, in any plane, the problem may be similar with DC-4s.

Two compromise solutions Patterson might work out:

- Standardize coach seat pitch and aisle width, for which CAB specifies no maximum seating density.
- Re-equipment DC-4 airplanes to remove 10 passengers with four-seat seating. Airlines would use five-seat seating to get to 78 passenger seats, and if it assumed the job of getting the more number is with one less row of seats would present a substantial engineering problem.

If United does step out of the coach business, CAB observers expect some

potential airlines to move in to fill the coach gap in United routes. Even now competitors, including non-scheduled airlines, now ask special CAB exemption to give coach service on U.S. routes. CAB could grant such permits now.

United, in stopping coach service, would be backing an official CAB policy order of a year ago. CAB used to effect the public convenience and aircraft operation expanded coach service, in all major routes. The Board is not apt to approve United's withdrawal without showing other means to fill the gap.

• **United High-Density Seating**—After telegraphing to CAA and generally following a brief explanation of his decision to cut back coach, Patterson also issued more detail on his position in a letter to CAA Administrator Charles B. Davis, with a copy to CAB (Aeronautics News Dec. 5 p. 17).

Patterson and his first decision to abandon high-density seating was made after a study of NACA research of DC-4 fire tests and of General Accounting Laboratory tests of passenger evacuation of the same plane. Since he was convinced it was unsafe, Patterson and he had a "moral obligation" to his the condition. When CAA notifies these same airlines and analyzes the studies, Patterson said, he believes the information will agree with him.

Beyond the test material, he has the opinion of two independent authorities whose views would be most detrimental to one industry if those are not a "stop look and before attitude" and the emergency evacuation coach service, which has been going on since for several months," Patterson said. "To us, the entire question is a real serious one. There has been pressure for the expansion of aircraft service. Airlines have been trying to make new airlines in these communities for expansion of coach service. I had most sincerely that we in the airline business as well as the regulatory bodies are overlooking that fundamental question of the which is involved in such expansion."

Patterson quotes his two independent



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REGULATOR VALVE
15 GPM 1500 PSI 1500 PSI 1500 PSI 1500 PSI

Pacific Division
Bendix Aviation Corporation
MOUNTAIN VIEW, CALIF.

not authorities on the subject to follow.

The National Fire Protection Association says "This loss for protection is being actively sought by high-density aircraft operators."

The investigation and it originally had expected a maximum DC-6 passenger load of 56, which is now authorized up to 57 passengers.

Passengers say "another authority" wrote:

"I feel that we are living in a host's paradise—first when 80 people are hospitalized in an air crash or lost, it is clear there will be very grave repercussions."

A few days later, the UAL president presented the same explanation to ATA directors at their annual meeting in Washington. But he ran into more criticism from both parties in American President C. A. Smith, but having saved against such publicity without conceding the industry risk.

There, neither National pilot nor president Walter Stierling, took aim with Patterson's facts. They claimed he could not substantiate his allegations and that such evacuation was unsafe. They said that Civil Aeronautics Board passengers could get out of a DC-4 coach in 90 sec.

Airline-Government Studies—The airlines, CAB and CAA have based their crash safety conclusions on at least 100 studies. The latest is an Aviation Safety Council report on evacuation techniques on a Cessna 440.

The text continued in the following recommendations:

- Develop let's and phrase instructions for crew and passengers to use in telling passengers how to use escape facilities. Conduct choice of words demonstrated through tests in order to speed up correct passenger action, they discovered.

- Streamline color of escape slides, such as the foot and hand loops on the escape slides.

- Recent, self-inflating crew and passenger, air wings and ground to keep the evacuation moving.
- Improve child handling techniques. As child should carry a child, they recognized.

- Make window remove hand levers, if possible, better grasp out.
- Make lower rows in future transport types. The higher the step-down from over-wing seats, the slower the passenger must exit.

Another summary of evacuation test results is presented in a recent paper by Dr. Barry King, chief of CAA's Aeronautical Design Branch.

This paper draws on eight previous studies of various studies and tests by CAA, CAB, airlines and Military Air Transport Service. It includes lessons learned during the just-completed American Airlines Cessna test.

How are Dr. King's views considered?

- Crew survival is the key to proper emergency evacuation. Crews' knowledge and equipment for such protection means "a high probability of survival of one or more other aircraft."

- Crew training is vital.

- Basic crew drill plan. 1. Open up exit and get passengers started out of it.

- 2. Give at least three instructions for use of other exits. 3. Keep them moving through your own exit. 4. Stand inside instructions to other exits.

- 5. Pick volunteer order and conduct them.

- 6. Instruct the passengers directly.

- Escape device. Rapid start or ramp exit is the best escape device. Since they are being developed. An escape slide is used best. Over the wing exits are best handled by telling the passenger to put his back through first, then his head.

Cornell Denial

Cornell University Aeronautical Laboratory has denied a denial in specific doc-

Revolt Hits CAA Safety Office

A revolt, simmering for months in the ranks of CAA's Office of Aviation Safety against OAS Assistant Ernest Henley and his deputy, William Davis, flared at a recent meeting of the Air Carrier division regional chiefs in Washington. Persons attending the meeting reported that Assistant William Davis said that CAA's personnel morale has been declining steadily since the recent administration was made directly to CAA Administrator Charles F. Hensley.

The CAA regional chiefs, on the "hot" list of Davis, who was supposed to be conducting the meeting, but asked that the Administrator be brought in to discuss the emergency personally.

Questions which provoked the threat were discussed Davis attributed to Administrator to establish a 24-hour Air Carrier operations watch at Newark Airport, presumably to satisfy recent congressional criticism.

- Order Rejected—Davis Administrator Hensley heard the executive's objections to the order, he recorded it. Assistant William Davis' statements said. Speeches in the protest were aimed at Leonard W. Ashwell, deputy chief of the Air Carrier division, who has been active since his leadership in the division since his appointment as deputy was announced Sept. 25 by Hensley. E. B. Fuzellini still holds the post of chief of staff.

CAA sources predict that Ashwell, an aggressive former Marine pilot, is moving up rapidly as the Washington organization and may shortly replace

that of senior news reports about the Cessna study of passenger evacuation from a DC-4 coach.

The study they made was used by United Airlines along with another picture of the evacuation in the loss for UAL, president W. A. Patterson's decision to cut the number of passengers seated in the United DC-4 aircraft from 66 to 56.

Dr. C. C. Farnas, director of the laboratory, and his statement was to correct the public record on the results the laboratory had reported on the tests and the role of the laboratory in the tests.

The Cornell statement said that the tests were "very substantially true" from those reported in the press release (3 to 34 sec.).

Dr. Farnas further stated that Cornell engineers made no statements, instructions or implications as to escape procedures, or "recommended options" in the report, such as were indicated in the press release, nor statements or instructions about the functioning of CAB or CAA.



Leonard W. Ashwell

Hensley, unless an even bigger job is opened up for him.

Meanwhile, CAA regional chiefs advised that a movement was about to continue the Air Carrier division of CAA in Washington as an attempt to correct the various regional divisions on an earlier problem in the second area. Proposed eventually would be a final policy for all air carriers on various safety regulation problems, instead of the various regional interpretations which have been a frequent source of confusion between airlines and CAA.

While some Washington sources agree that coordination would be a good thing, no indications for a definite time-

table for it taking place were offered.

Hensley was not at the meeting at which the threat came, although he was present at the meeting. It was stated at the meeting that Hensley was at Oklahoma City's CAA office, "checking up on his flight time."

- Comments Farnas-Moreover, after Washington sources indicated that Hensley was not attending, Commerce Secretary, Stanley Wicks, may take a more active part in strengthening the CAA top management, than his predecessors. These sources predicted that Hensley will likely choose his close to hold on to his job, although not industry opinion, Aviation Distribution and News Services Agency, recently passed a resolution at a Florida convention asking for Hensley's resignation.

The CAA Administrator reports to the Secretary of Commerce and his own staff, not independent authority. In fact, the Secretary is the Administrator's primary boss. Hensley is the Secretary's chief of staff in his agency.

Washington sources predict that the economy-oriented Commerce Department will not take drastic action in CAA to limit the responsibility of imprudent administration employees that gradually has been asserted over the heads of the more efficient working level CAA employees.

Agreement at the Washington meeting was that the Washington meeting was based on the threat that it was a political gesture and that the department would be better off in terms of higher traffic frequency. Also, it was pointed out that the more other airports which would require such an investigation if it set up for Newark.

One other objection to the proposal to limit industry is that it would mean "pulling the rug" from CAA's support of the industry, instead of the "cooperative" approach toward CAA industry. CAA has to talk about it.

- Ashwell Transfer—Ashwell was named chief of Washington area. Ben Franklin last spoke about the trust of the Air Office of Aviation Safety organization. He had been chief of aviation safety advice of the CAA's (air transport) region. He came to Washington as chief of the Scheduled Operations Branch of the Air Carrier division. CAA, and moved on to the deputy division chief post in September.

A graduate of the University of Washington and of the U.S. Navy Flight School, Ashwell returned to CAA in 1946 after serving in the Navy. He left active duty as a lieutenant colonel. He was later named chief of the CAA from 1957 to 1960, served on the West Coast.

The question of just how much support Ashwell has in the CAA hierarchy and where it lies has been a battle topic

of speculation within CAA ever since he came here in Washington. The recent conference is not the first time that he has "spoken out at meetings" on appropriate issues.

In-Flight Refueling for Airlines

System may be used by 1960; it already has been proved reliable and safe in extensive military tests.

By Irving Stone

Commercial airlines may begin in-flight refueling within the next year, using advantage of experience gained by the military to start the operation as a highly refined procedure for longer flights and greater safety.

Aviation Division now studies aerial refueling of domestic commercial flights for sometime between 1957 and 1960, roughly coinciding with the estimated introduction of jet transports in the United States.

In-flight refueling already is being used with one and a half to two jet aircraft. The Navy and Air Force are using both the Boeing Flying Boat system and the conventional tanker system of Flight Refueling, Inc.

Col. David C. Bellinger, director of the Air Force's Air Command, has announced the procedure for the Air Force is now under its control.

"You can start on a long overcast flight with complete confidence," he says. "Or at night, it's now considered a routine job. The pilot doesn't have to 'vent' it."

- Reliability—Flight refueling systems already have proved highly reliable in tests. Republic Airlines, in its first aerial refueling tests, reported that 100,000 hours of service have been provided in 100,000 hours of service.

Refueling points at which aerial refueling is now being used are in the Midwest, the Northeast and the South. The Air Force can be contacted at the flight refueling facilities.

Refueling points at which aerial refueling is now being used are in the Midwest, the Northeast and the South. The Air Force can be contacted at the flight refueling facilities.

Turning a tanker crew for the refueling operation is simple. A single series of tanker, men can be checked out successfully in a single flight, and a group has been given in only 500 minutes a day.

Safe. Two-Four hour on the air, it looks as though refueling operations will be in the hands of a few select individuals—most notably in the Air Force. Refueling in the past has resulted in the atmosphere of safety, gale, be-

cause it was found that many of these men's records.

Refueling operations are the procedure's next. In addition to its price decided of allowing a plane to take off with a minimum of fuel and a maximum of payload, it's most often to refuel in mid-air, to its own disadvantage, and take off again. Refueling between 60% of aircrafts are due to situations involving the leading, lagging and taking off.

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Airline Captain Teaches AF Pilots

Capt. Charles F. Blair of Pan American World Airways, who was the first man to fly a single engine plane (a converted North American F-51) over the North Pole on a flight from Narvik to Alaska, is teaching navigation to USAF pilots.

Blair has been appointed to the Air Force as consultant to teach its fighter pilots the simplified version of "pilotage" or visual navigation which makes it possible for a pilot to do his own navigation.

Working with key fighter personnel at the 5th Fighter Escort Wing, Alhambra, Cal., Blair is increasing the number of fighter pilots who are checked out in navigation. Obvious advantages are that fighter pilots will have a method of checking radio navigation aids should there be doubt of their accuracy or if they fail. And the system will permit more fighter movements across regions of the world where radio navigation aids still do not exist.

Southern Airways Renewal Is Urged

Southern Airways will get renewal of its certificate in February of 1957 if Civil Aeronautics Board upholds the latest endorsement by President F. D. Roosevelt of Southern's progress in traffic development.

The CAB executive predicts growing industrial areas, expansion in southern states served by the airline, but he stresses Southern's records for replacement of trunk airline service through some local ports which are now served by Eastern National and Chicago & Southern.

Average passenger load of Southern increased 90% the first half of this year over the same period a year ago compared with a 15% increase for local service airlines. However, its load factor of 20% compared with an industry average of 50%.

Southern's total passenger load to local ports last year was \$1,750,000—\$175,000 more than Trans-Texas whose schedule was examined by the Board this year. Southern's operating expense of 91 cents a plane mile is less than the industry average of 93 cents.

Western to Increase Coast Coach Fares

Western Air Lines when it finally gets service on the new coast-to-coast Los Angeles-Fresno route, following the lead of California Central which took similar action several months ago.

TWA and United are expected to follow later.

The rate increase is scheduled for Feb. 1. It goes from \$12.38, or about 34 cents a mile, to \$13.58, or about 4 cents a mile—more in line with such fares elsewhere.

Cal Central blamed the rise on rate cuts since 1949, off the war days to 3 cents a mile—much held until the Korea war inflation. This year, after Cal Central converted to Westernizer Martin 2-8-2s, the company found it could not make reasonable profit at the 14-cents-a-mile rate unless, and apparently the other airlines are finding the same.

California Central generally has led the other airlines on fare changes because it is a non-unionized enterprise; carrier rates subject to Civil Aeronautics Board control.

Dreyfuss Interiors For Super Connies

Lockheed Aircraft says Wright Turbo Compound engines will give its new Super Constellation sufficient speed and range to make it worthy of being designated the "first truly nonstop trans-Pacific plane."

The Super Constellation will be powered



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grew 39% over a year ago to 38,210
jobs.

►Miami International Airport will
spend \$190,000 on an air cargo build-
ing.

►Midwest Airlines has added CAB to
handle Colonel Airlines' short haul,
small city route stops in Midwest if
Colonial merges with another trans-
line, later-once distances as these
routes are even shorter than those of
the local service line, executive vice
president Robert Pasch says.

►Northwest Airlines set some kind of
a record as a 15hr. 56min. Tokyo
Seattle transoceanic flight that "arrived in
the U. S. before it left Japan." It
left Tokyo International at 9:00 a.m.
Tokyo Time Sunday, crossed the In-
ternational Date Line and arrived Seattle
Tacoma three minutes earlier on the
same day, West Coast Time.

►Pan American World Airways must
object to CAB individual contracts for
"free transportation" converted with
all promotional projects during the next
12 months. This resulted from CAB
prescription of "free" transport term
by PAA, allegedly in violation of the
Civil Aeronautics Act. PAA man-
dated, lost a deal with TWA Japan Co.
to Air France because of CAB delay in
approval—plus, now in demand under
CAB decision on all projects.

►Pioneer Air Lines has transferred its
office to Los Angeles from to United,
ending 11 years there. In 1994
Pioneer already has new Martin 202s
—first purchase since for a local service
line. CAB had refused to approve
aircraft transfer to Pioneer—in indica-
tion the Board would crack down on
Pioneer's mail pay rate. If the company
persisted in this expensive contract.

►Riddle Airlines, Inc., is the new CAB
approval of Riddle Airlines. Co-
ventured with Cape Line to Puerto Rico
and domestic routes.

►Trans-Pacific Airlines has offered CAB
permission to call itself Alaska Airlines
or TPA, Alaska Airlines, as it has been
doing for two years. TPA, keeps also its
legal name Trans-Pacific Airlines
Toucan.

►United Air Lines November revenue
passenger miles rose up 9% over same
month last year. Company won a
court fight against the California Pub-
lic Utilities Commission claim that the
"0.001 L. A. California bond fight is
subject to state regulation." "A sub-
stantial portion . . . is over the high
way and is not within the State of Cal-
ifornia," the court ruled.

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the Coast R. Co. Bridge.



A Pilot Writes to Santa

Dear Senator:

Here is one Christmas list:

• **Approach lights** You know I have wanted these for years and every last Christmas you bring bigger and faster airplanes, people want me to make lower and lower approaches, and I have less time to see where to land. So I'll put that on top of my list and give hand that the centerline lights will soon be waiting at the airport for me.

- **Rerun lights and markings.** For the same reason I need approach lights I need rerun guidance. Even if all reruns were properly passed it would be a great help. With good lights, especially around the threshold, I believe we all could land more safely.

Visible splashes: The little splashing machine you give me for savings has lights every year ago on good eye color. Says: Face with good eyesight, you can't be seen until it's almost too late. And then if you sit in a bunch of brains and you can't all which way the question is posed. Could you get me some powerful, steady one? That could you get me a big, bigger. My power one have to get on top of the robot. This would make your thing like: Also, what could you do to make splashes more visible during the day? Splashing splashes when the sun is not is almost an impossibility. I know this is a difficult request to meet, but it was worth a try as a test.

• **Alfonso's side:** With daylight viewing, cathode tubes no longer an option. I now would like to have side in my cockpit. Santa Thru I could avoid those thunderstorms, the fuel and ice, observe the terrain and perhaps someday even get a warning of proximity of other aircraft.

• **Autism's false cure.** The second miler is doing a good job there too, but without making identification we are wasting time. I'm sure we have some of those in our staff! Could you hang out with us?

• **Weather observations.** Many people here seem that we have to be those foolish weather men/people, how about a method of making these more accurate? About half the time when I'm told to report him a 1,000 ft. ceiling, I'm lucky to find 500, or a day say I don't see

* **Fingerprint airplanes.** Your new airplanes are nice, Santa, but god! They are built easy and quick. Sometimes the pilots don't know about the fix issues enough either. If you could give us better fingerprinting it sure would be wonderful.

• **English language system:** I'm sorry, St. Nick, but I still can't read the NOTAMS. When I see BRBOP on the teletype I don't know whether to stay home or go dancing. Since it's true of my traffic clearance, "No Purple 4" confuses me. Why can't they say "via Newark"? Twenty signs in plain English also would be appreciated. All the mysterious little codes used in weather forecasts make life difficult.

Some of the poems you brought me in other years are still in good condition, Sam, and I want to thank you for them. Thermal drying, steerable snowshoes, VIIP suite accommodations and penmanship are among the recent gifts I ever received. Some often like the automatic barfacing and covering propellers, also are wonderful, except that sometimes they don't work so well. If you could make these more reliable we would have one of the greatest gifts of all time.

I know you can't bring all these at once, Santa, but gee, I sure would love to have them. Please do the best you can!

A Very Merry Christmas and Happy New Year

L C E

WHAT'S NEW

New Books

Jane's All the World's Aircraft 1952-1953, compiled and edited by Leonard Bridgman, 324 pages, including index, profusely illustrated. Published in the U.S., Canada and South America by McGraw-Hill Book Co., Inc., 330 W. 42d St., N. Y. 36, in Great Britain by Sampson Low, Marston & Co., Ltd., 25 Collier St., London, W1. Price £72.00.

One of the first reactions on getting a new "Junkie" is to see what sort has been dug up on Russian aircraft, there is nothing unusual in this new volume, but then Rodgman sets his common sense.

Mission is made of experiments the Soviet air force reportedly has been testing with four-engine TU-4s (B-29 copy) modified to carry a MG-45 jet fighter under each wing leading edge extended from a goose-neck structure. There is a photo of a bifurcated nozzle, unidentified single-engine turbine transport apparently designed to operate in and out of small fields.

Instantaneously noticeable is the fact that the first time a book thinner than previous editions. Among production costs have borne the colour to reveal, for example, presentation of basic airline data is as to treat the fat yet keep the meat. The aircraft and engine data sections retain their excellent presentation. There are 573 illustrations, 511 being new. In the aircraft section, the U.S. takes 75 pages, Britain follows with

A new and helpful feature is references in the indexes to all persons described in the preceding six volumes. —EJR

Telling the Market

50-Year Index to ASTM Technical Papers and Reports, 216 pages, available from American Society for Testing Materials, 1916 Race St., Phila., Pa., price \$6.

It is a detailed index to all ASTM technical papers and reports (listing author and subject) dealing with properties and testing of materials appearing in ASTM publications from 1988 through 1990. Included are a number of technical reports not credited to specific authors.

Second Wind for Bess Aircraft is an illustrated brochure describing complete rehabilitation services for more than 50 aircraft handled by the Greenville Overhaul Division of Texaco Aircraft Corp. Write the division at P.O. Box 1026, Greenville, S.C.

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A MESSAGE FROM THE PUBLISHER

With the coming of the New Year, *Aviation Week* will have a new Publisher, Robert W. Martin, Jr. For the task of leading *Aviation Week* into new and larger areas of service, he is exceptionally well qualified. Bob has been associated with me from the beginning of *Aviation Week*, serving in many capacities, and has been extremely satisfied with every phase of the magazine's development. Moreover, he has a long record of experience with *Aviation Week* and its association with *Aviation Week*. Bob has many friends in this area, all of whom, I am sure, wish him well in his new responsibilities.

Aviation Week's spectacular success has been described by some as a publishing phenomenon. As the founding Publisher of *Aviation Week*, I would like to take this occasion to review briefly the history and growth of *Aviation Week*—and to point out that the great success of success which has come to this period is the very reason for the appointment of a new Publisher.

Aviation Week made its first appearance as *Military Aviation*, July 7, 1947—scarcely a prophetic time, as it was told, for a new publishing enterprise devoted to aviation. The confusion and depression which enveloped aviation immediately following World War II seemed enough to discourage even some of the most daring.

But, it seemed odd to us that aviation was the threshold of a new era—another burning point in its history. Technical developments then in progress and on the horizon (some of which have since been achieved) seemed certain to bring a new and brilliant future for aviation. It seemed even clearer to us that if our optimism was to be even partially sustained, the industry would both require and welcome a more comprehensive job-leadership service than any then available.

Under the stimulus of World War II, aviation has grown into one of the nation's great industries, and, with this growth, it has assumed many new and strange problems. Now the aviation executive's frame of reference must include far more than design and production. Now he must deal with such typical big business problems as labor relations, taxes, finance, diplomacy, and regulation—in any number of a flood of new technical developments, such as atomic energy, rockets, high black man, and aviation, to mention a few. This, we reasoned, called for a new and unique publishing service.

When it was that, having no decision more on hand than on good advice, *Aviation Week* was born. That our faith has been generously rewarded is now clear.

Behind every successful publishing story lies the loyalty and enthusiasm of the publication's readers. *Aviation Week* now has the largest circulation of any aviation business magazine—now over 40,000—paid circulation at a subscription price of \$6.00 a year, the highest in its field. What is more important, the number who renew their subscription each year has increased steadily to the current all-time high of 60%.—the highest renewal rate of all paid circulation aeronautical publications.

Yet *Aviation Week* has not sought mass circulation. It is not a magazine for the aviation fan. From its beginning, *Aviation Week* has always insisted that it deliver to its advertisers the most effective audience possible. Through sophisticated controls, subscriptions have always been so-

stricted to persons with a known commercial or professional interest in aviation.

Thus it is no more accident that 3,249 pages of advertising have appeared in *Aviation Week* during this year of 1952. This substantial volume of advertising gave place to *Aviation Week* among the 50 largest magazines published in the United States.

This spectacular growth in circulation and advertising has been possible only because of an equally spectacular editorial performance. Editor Robert H. Wood has assembled what I believe to be the largest and most competent staff in aviation journalism. Under his direction, this staff writes full time and exclusively for *Aviation Week* and he has supplemented this staff with an opening array of on-the-spot correspondents in all U.S. aviation centers, as well as 24 countries overseas, plus the vast services of Associated Press and United Press.

Naturally, I like to think of these facts as representing some measure of *Aviation Week's* success. To that must be added, of course, the success of the several auxiliary aviation activities in which our Company is engaged. To mention a few, there is the Airport Director, now enjoying a rapid rate of acceptance as a result of its accuracy which, as you, is a result of the tremendous amount of work put into its urgent dissemination. *Aviation Week* maintains a graduate fellowship at the Massachusetts Institute of Technology for advanced study in the field of Aeronautical Engineering. So far, this fellowship has seen one promising, young aeronautical engineer through his graduate work, another one through his first year. *Aviation Week* is also the donor of the Air Safety Award presented annually by the Flight Safety Foundation.

So it is that *Aviation Week*, like the field it serves, has become big in its own right, as big, in fact, as to require a Publisher whose full time and attention can be devoted to the task of properly discharging *Aviation Week's* responsibilities to its readers and capitalizing on its opportunities for greater service.

There will be no change in the editorial policies of *Aviation Week* as a result of this change in Publishers. Bob Martin was selected for the job because he has been familiar with our editorial policies and objectives since we commenced publishing. Whichever success has come to *Aviation Week* has been the result of its editorial performance.

I would be less than honest if I did not say that *Aviation Week's* success has been a tremendously gratifying experience to me; that to pass the torch to another at this high point has been a difficult and regretful decision. But, I have other tasks to perform, with constantly increasing demands upon my time. So, I have asked Bob Martin to take over *Aviation Week* because it needs him, and because I must now have time to devote to the other McGraw-Hill journals for which I am responsible. They, too, are growing.

Aviation Week will never be out of sight. Nor will it be out of sight. The other McGraw-Hill publications I serve also have many important aviation interests. One, especially, to my many friends in all parts of the aviation field this is by no means a "goodbye."

—Robert F. Bogen.

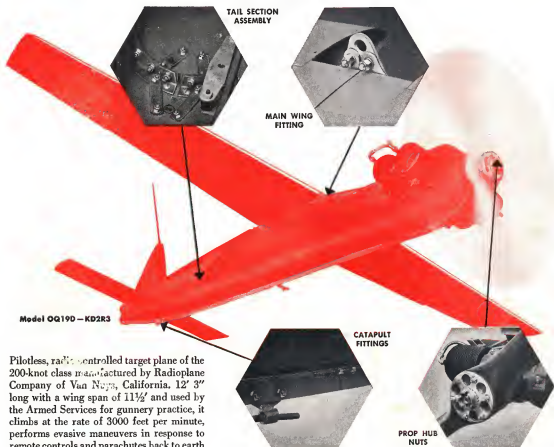
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